School Shop

vol. XII no. 6
FEBRUARY, 1953

Shop Teacher Liability
by E. W. Tischendorf

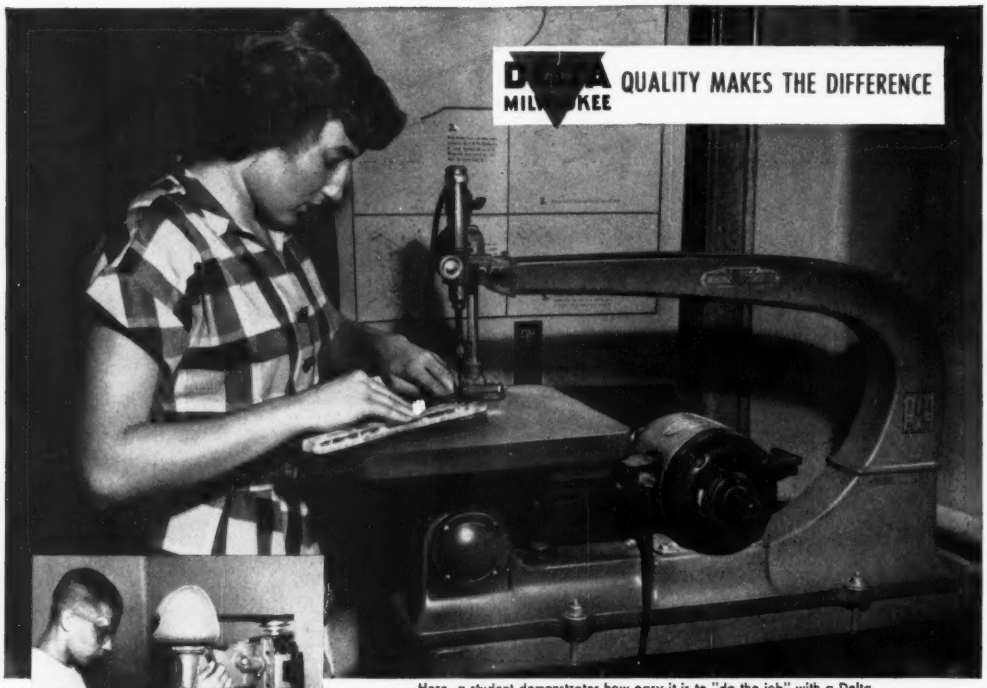
Electrical Pocket Tester
by Robert P. Pettet

Photography in the School Shop
by David Rosenfeld

Cast Aluminum Flasks
by William B. Doose

Cover story: Photography student at Metropolitan Vocational High School in New York City taking a shot. For a description of a shop course in photography, see page 14.

THE MAGAZINE FOR TEACHERS OF INDUSTRIAL EDUCATION



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School Shop

THE MAGAZINE FOR TEACHERS OF INDUSTRIAL EDUCATION

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School Shop TALK

COMMENTS ON ISSUES FACING INDUSTRIAL EDUCATION

A Guest Editorial

Unified vs. Dual State Industrial-Education Associations

Industrial education has been a part of the public schools of this country since 1884, when the first public-supported manual training school opened its doors in Baltimore. Its nomenclature has undergone several stages of evolution. Workers in the various phases of the subject, in many instances, have not understood each other too well, and the lay public generally has made little if any distinction between industrial arts and its vocational counterpart—the day trade school.

Today, however, the term "industrial education" is rather generally accepted in its generic sense to include all instruction of an industrial nature, just as the term "social studies" is used to include all instruction in the social aspects of society—history, economics, geography, government, sociology, and the like. Industrial education, thus conceived, properly includes industrial arts, trade-preparatory classes, apprenticeship training, part-time and evening trade-extension classes, technical institute work, and in-plant training. These can well be grouped into two categories —industrial arts and vocational-industrial education.

In the past, and in some states even yet, teachers of industrial education have been organized into two, three, or even four different state organizations —one for industrial arts, one for trade teachers, one for coordinators, and one for technical school personnel—each going its own way, indifferent to, if not openly antagonistic toward, the others. Such dualism has created confusion, misunderstanding, animosities both within and without the ranks of industrial-education workers. It has made the task of promoting and developing a well-rounded program of industrial education difficult if not impossible.

However, as terminology and objectives have been clarified and as workers in the various phases of industrial education, through teacher education and otherwise, have gained a better understanding of the entire field, there has been a tendency to organize unified state industrial-education associations, bringing all the groups together for unity and strength. Almost invariably where outstanding state programs of industrial education are found, there also will be found a unified state industrial-education association promoting and developing the work.

A unified state industrial-education association is a logical thing, because in many, if not most, school systems the same person supervises all phases of the work. Likewise, many teachers (over half in some states) divide their time between industrial arts and some phase of vocational-industrial education. Having two or more organizations representing their work means that such supervisors and teachers must either choose between the different associations or pay dues to all, which hardly makes sense.

Dual associations complicate attendance at state meetings, for where such an arrangement exists administrators and school boards get the impression that there are too many meetings for industrial teachers to attend. Dual associations likewise complicate the matter of commercial exhibits at conventions, for firms are loath to set up two or more exhibits in a given state. Confronted with the possibility of offending one group if they exhibit for another, they are inclined to skip all states where industrial education is split down the middle.

While it is true that industrial arts is a part of general education and vocational-industrial education is a form of specialized education designed to develop occupational competency, the two are more alike than they are different. Therefore, workers in the two phases of industrial education, if they are smart, will get closer together, not farther apart. Unified state industrial-education associations are an important means to that end.

Industrial education is concerned with the dominant element in American culture—industry. What is needed on the local, state, and national levels, for *unity, strength,* and *progress,* is organized leadership that can consolidate the various groups working in this phase of education and get them to work together rather than against each other.—*H. H. London, Professor of Industrial Education, University of Missouri.* ★

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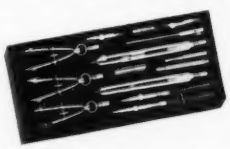

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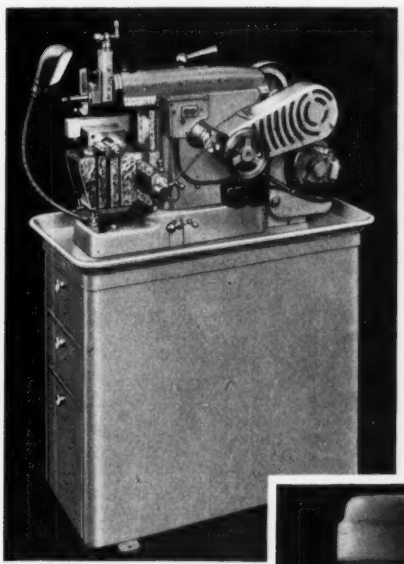

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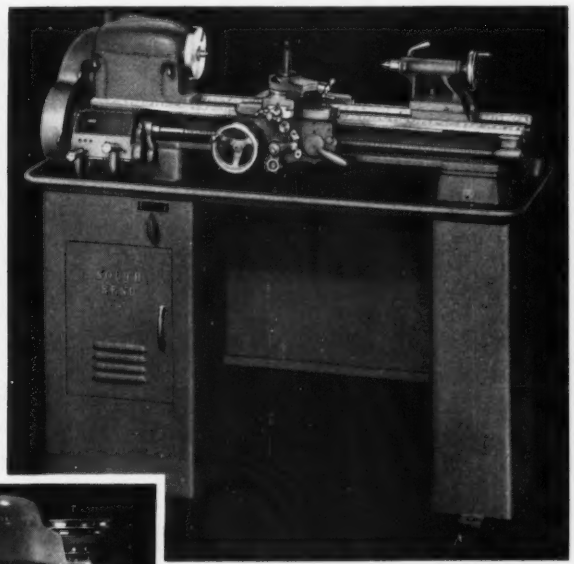

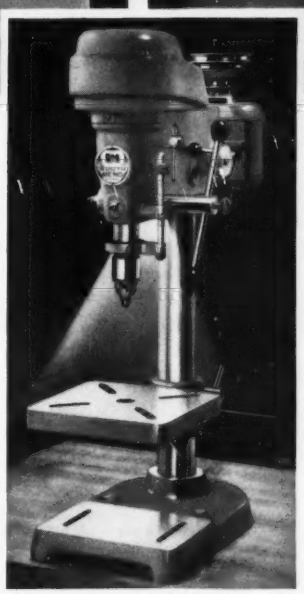

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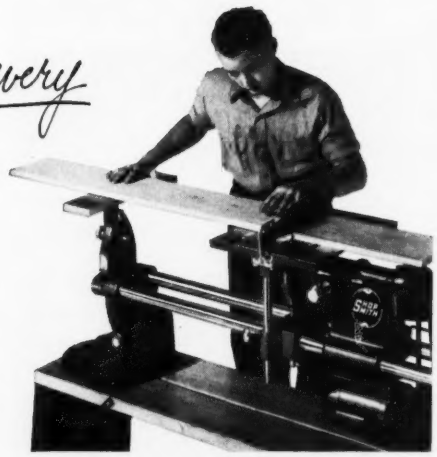

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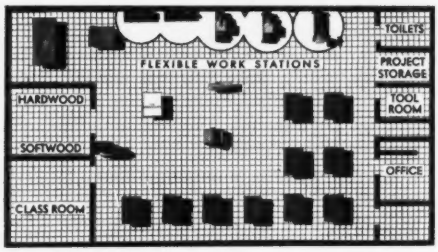

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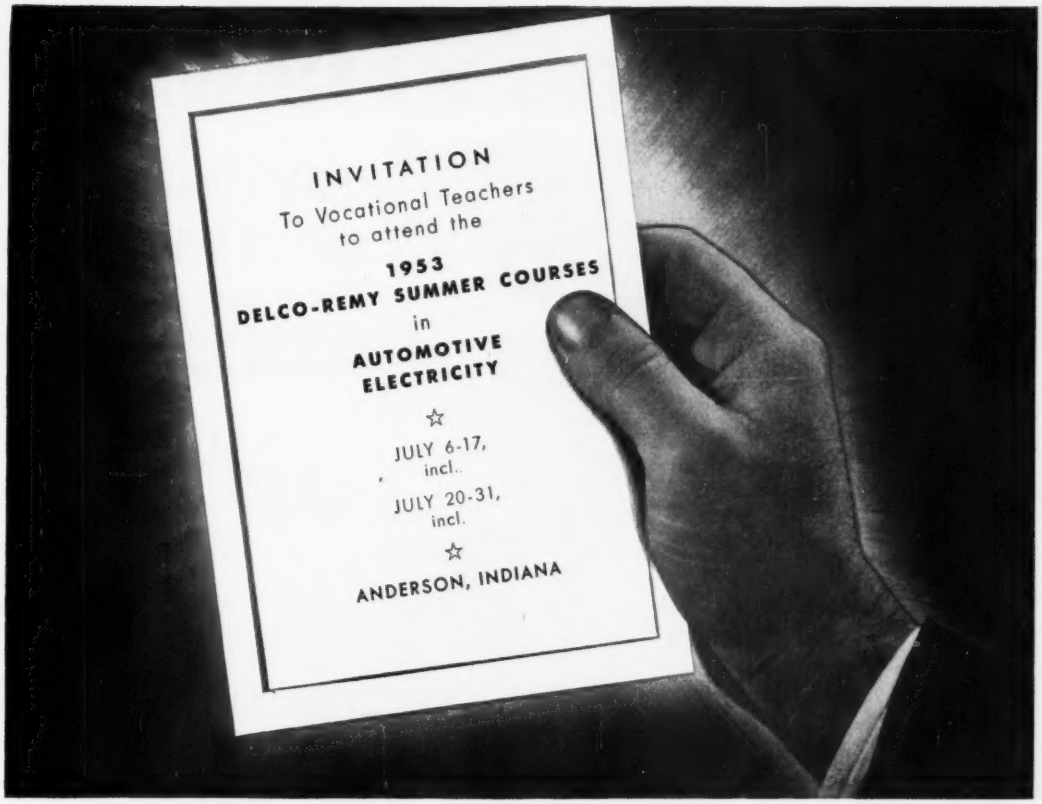

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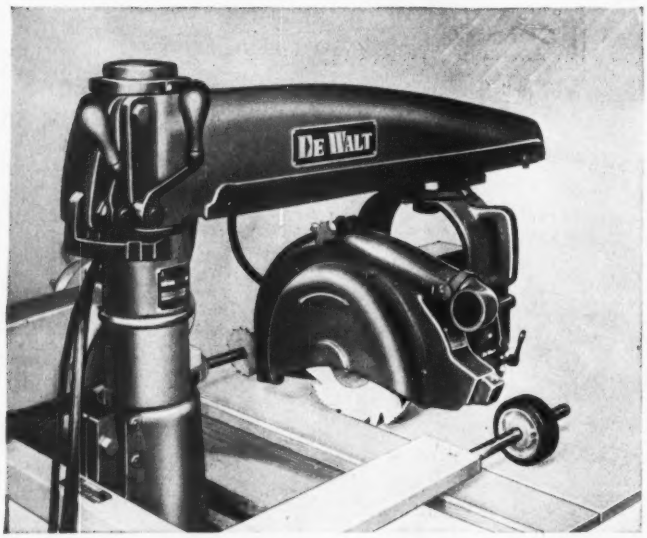

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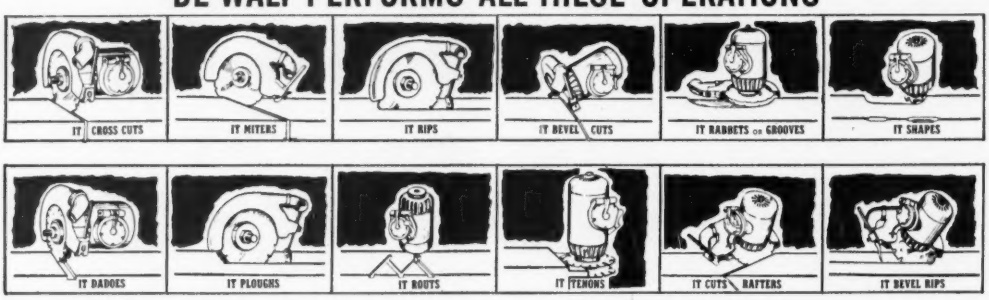

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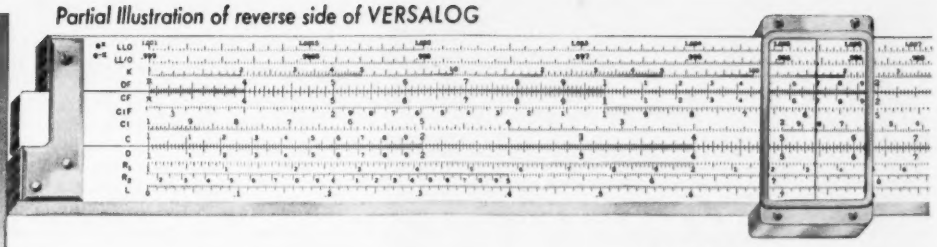

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What you should know and what you should do about

Shop Teacher Liability

By E. W. Tischendorf

Head, Industrial Arts Department, Kent State University, Kent, Ohio

FOR a long time industrial-education teachers have been concerned about the loss of their modest savings and the insecurity of future earnings in case of a lawsuit and judgment against them in the event of an accident to a pupil under their supervision in the school. These teachers should be grateful to learn of the national program being sponsored by the American Industrial Arts Association to obtain protection for all teachers from personal costs and damages evolving from accidental injuries to pupils.

An article titled "The A.I.A.A. Gives Leadership to Teacher Liability Program," by Merrill C. Hamburg, supervisor of industrial-arts education, Detroit, Michigan, in the October, 1952, issue of *The Industrial Arts Teacher*, relates the details of the ground work done in behalf of protection of teachers. A subcommittee has already met with Frank Hubbard, director of the division of research, and with Madaline K. Remmlein, assistant director and specialist in school legislation, both of the N. E. A.

Two definite recommendations, according to the article by Mr. Hamburg, resulted from the meeting. They are as follows:

1. That model legislation be prepared which would permit school districts to accept judgments against teachers and permit them to use money collected for educational purposes for liability insurance.

2. Since the proposed legislative program will of necessity be a long-term matter, that the Association take immediate steps to make accident liability insurance available to all teachers on a national basis until such legislation has been passed in the several states.

Dr. Wilbur has appointed a committee which is responsible for a definite teacher liability program. The members are as follows: Gerald Baysinger, chairman, Wayne University, Detroit, Michigan; D. Arthur Bricker, director of industrial arts, Cincinnati, Ohio, public schools; Merrill C. Hamburg, supervisor of industrial-arts education, Detroit, Michigan, public schools; Wayne P. Hughes, National Safety Council, Chicago, Illinois; John R. Ludington, specialist for industrial arts, U. S. Office of Education, Washington, D. C.; DeWitt Hunt, Oklahoma A. and M. College, Stillwater; John Hurley, acting director of industrial arts, New York, N. Y.; Roy Radtke, director of industrial arts, Milwaukee, Wis. and E. W. Tischendorf, Kent State University, Kent, Ohio.

School Boards Not Liable

It has been well established that although an individual teacher may be liable for negligence or wrongs committed while in the exercise of his duty, the board of education most specifically is not liable. Therefore, the cost of defense of any legal action, together with the payment of damage, would rest exclusively with the teacher. There are, however, four states in which the school districts may assume the teacher's cost in defending himself in court, and also may pay the damages awarded if the case is decided in favor of the plaintiff. The four states are Connecticut, California, New Jersey, and New York.

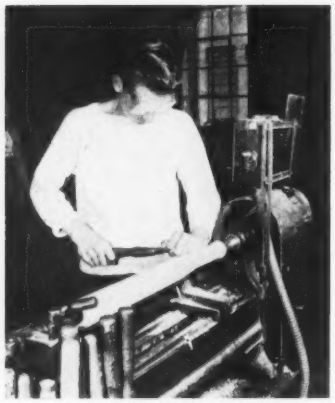
In the other 44 states, the school districts enjoy the sovereign right of immunity from liability for accidental injury to pupils while the pupils are under the jurisdiction of the school or any employees of the school district. It is in these 44 states that the teacher is liable for the cost of defending himself in a legal action and for damages which might result from such action. Public funds in these states cannot be used to defray legal expenses of a teacher for defending himself in a lawsuit even though he was not found guilty of negligence, nor can public funds be used for the payment of premiums for appropriate insurance.

There are relatively few accidents to pupils about the school which cause injuries requiring great expense for medical treatment. There are relatively few accidents for which teachers are held liable in court because of their negligence. These accidents *are* sufficiently numerous, however, to justify serious consideration by all states to provide the same protection for their teachers against liability as is true in several of our states.

Will teacher immunity from court costs, attorney fees, and damages evolving from accidents to pupils under their supervision tend to result in teacher negligence? In some states, teachers have tenure of office after meeting specified requirements. Such tenure is subject to giving satisfactory service as a teacher and to maintaining personal conduct befitting an employee of the community responsible for wholesome character development of youth assigned to them. Efficiency and personal conduct and character are the factors basic to the employment and dismissal of a teacher regardless of tenure status.

Take a shop teacher, for example, in a school district where teachers are liable for accidents to pupils but immune from cost and damages. If he, in court, is proven negligent because of his failure to act or to act properly in a given situation, he may be guilty of inefficiency and subject to dismissal by the board of education. In other words, teachers consistently re ponsible for ex-

This type paper cutter in the graphic-arts shop increases safety and lessens teacher liability.



Eye accidents, which may lead to costly damage suits, can be prevented by the use of goggles.

posing pupils to unnecessary hazards may be dismissed by the school board. There is a moral obligation which a teacher must assume regardless of the liability protection he may enjoy.

It might be assumed that safety of pupils in the schools is a responsibility of the teacher only because of the legal implications. This is, by no means, true.

Need for Safety

Teachers should never assume that they are to know, teach, and develop desirable safety attitudes and safe practices among their pupils *only* because of the legal responsibilities they have for the welfare of the children entrusted to them. Anything that might be recommended to protect teachers from damages does not minimize the need and importance of a good safety program, nor excuse poor teaching or carelessness in the upkeep of equipment in the shop, laboratories, gymnasium, or any other part of the buildings or grounds of the school. The best guards on machines in the shops and the best condition of all school equipment and buildings are taken for granted when considering the protection of teachers from liability damages in case of accidental injury to pupils in the school. Likewise, it is assumed that teachers, supervisors, administrators, and all other employees of the school district are well qualified in their respective fields.

Teachers should be protected, however, from costs and damages. They should at least be as immune from the damages and costs growing out of accidents as are the owners of automobiles who have personal liability insurance, or the foreman or supervisor in industry who is immune from liability for injury to the men under his direction. Workmen's Compensation Acts provide funds for medical attention and rehabilitation of employees in industry.

It is the better citizens of our communities who have adequate protection from liabilities resulting from the operation of their automobiles or the activities of friends and employees about their property. This protection does not generally contribute to carelessness on the part of the individuals having the protection. Nor does protection for teachers from liability for damages result generally in negligence on the part of the teacher. Such protection helps to develop more poised, happy, successful, and useful citizens and teachers.

Teachers, of all people, need to live under conditions which are not frustrating; conditions which do not lead necessarily to a life of luxury, but which are conducive to efficiency in teaching, and to happy, useful, and successful living in the community. Teachers need to work under conditions which contribute to their peace of mind.

Children can be so completely shielded that an educational program is curtailed. Poe, in his dissertation, *School Liability for Injuries to Pupils*, states that, "Most of the injuries to school children occur in three of the recently introduced phases of education. These are: industrial education, physical education, and the transportation of pupils. The occurrence of most legal cases involving injury to pupils in these modern developments of education indicates that either the injury rate is higher or that injuries to pupils are more severe in progressive schools."

Accidents should not happen—nor should injuries occur to pupils. However, there have been accidents; pupils have been injured even though qualified and conscientious teachers were on duty.

How many teachers have not at some time done something, or failed to do something, which, if an accident to a pupil under their supervision had occured, could have been proven negligent? The responsibility of a teacher for the welfare of his pupils is very great indeed. Under the conditions which many teachers work, it may be physically impossible to give the individual pupil the care which legally and morally should be given.

Liability Insurance

Teacher-liability insurance for the protection of the teacher is available at a reasonable cost. But care in the selection of the agency, of the insurance company, and of the contract—especially as to face value and exclusions—is important. Recently, a public-utility company settled a claim with a plaintiff for the loss of an arm for the sum of $90,000. That raises the question, what should be the minimum face value of a teacher-liability insurance policy?

One teacher-liability policy examined by the writer had the exclusion, "This coverage shall exclude any obligation of the company for such injuries if caused by———(D) any aircraft." Obviously this contract is unsatisfactory on a group basis when even one participating member has a phase of aeronautical shop work in his program.

Prompt and efficient service is an important criterion in the selection of an agency. The most important criterion for selection of the insurance company is, no doubt, affiliation with the National Surety and Casualty Underwriters, a bureau of insurance companies, with headquarters in New York City.

Teacher-liability insurance is available to members of the Ohio Industrial Arts Association through the association. Anyone wishing a copy of the contract for industrial-arts teacher-liability coverage in Ohio may send a selfaddressed stamped envelope to the writer.

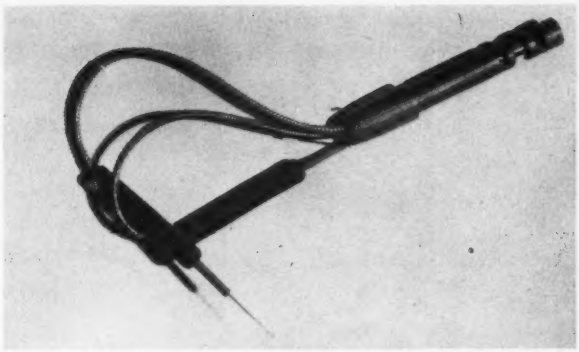
All industrial-education teacher organizations—local, district, state, and national—should give wholehearted support to the movement to bring about protection of all teachers from costs and damages resulting from injury to pupils in the school. Individual teachers have a professional responsibility to support their professional organizations by at least bringing their memberships up to date in the organizations. Group insurance on a national level, supported by the teachers until state or national legislation can be brought into effect, seems a logical and rather quickly attainable goal. It should be a temporary measure. ★

By Aaron Adams, Cincinnati, Ohio

Electrical Pocket Test Lamp

By Robert P. Pettet

Manley Vocational School,
Chicago, Illinois



This practical electrical pocket test lamp has many features not found in a regular commercial lamp of this type. Made by Howard Bersh, the tester won a prize in the Ford IAA Contest.

A USEFUL article to have in a tool kit is an electrical pocket test lamp. Here is one that can easily be made by pupils in the electric shop.

This test lamp has several features which make it more practical than the regular commercial test lamp of the same type. It has longer leads, providing for a greater range of use due to the longer span between prods. The coil spring which covers the leads considerably increases the life of the tester by preventing sharp bends. Its prods are thin and sharp to pierce insulation easily. And, as an added feature, recesses are provided for the prods in the base of the lamp head to insure easy, safe carrying.

The tester, which can be made of materials readily available (see Bill of Materials), serves as a practical project because it provides opportunities for planning, layout, measuring, sawing, filing, drilling, coil-spring winding, grinding, splicing, and soldering.

Part No. 1, the fiber disc, may be punched out of sheet fiber with a hand punch. The fiber lamp housing (Part No. 2) may be cut out with a hack saw with several blades mounted together in the hack-saw frame. The base (No. 3) is tapered at one end to cut down weight and to make it less likely to get caught on objects when the test lamp is being used.

The wire used for the leads (No. 6) should be a good stranded flexible wire with an insulation that will stand up under use. The protective shield for the leads is made of music wire, gage No. 10. This is wound into a coil spring, using a 3/32" rod as a mandrel, and then stretched to the desired spacing of turns.

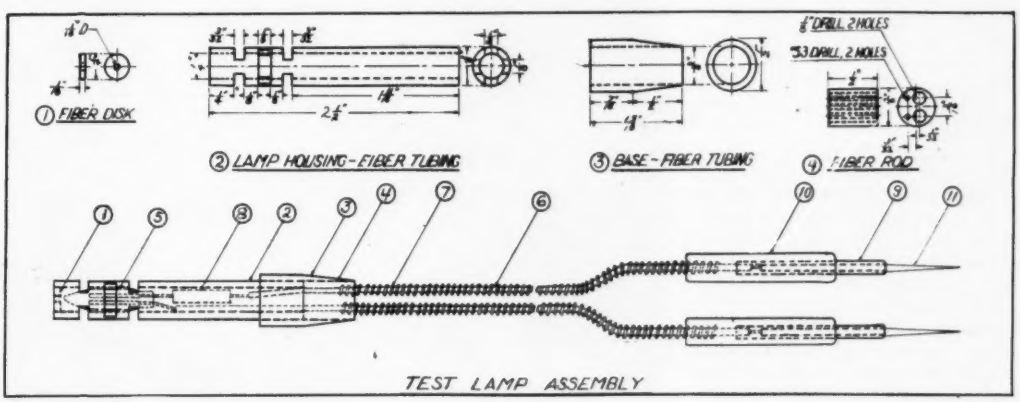
The plastic tubings (No. 9 and 10) serve as insulators for the hands of the user. The insulation on Brown and Sharpe building construction wire, TW type, gages No. 14 and either No. 8 or 6, can be slid off the copper and used for this tubing.

The test prods, made of No. 20 gage music wire, should be ground into long, slim, tapered points, as shown, so they will easily puncture insulation when necessary in testing equipment.

Although all parts making up the mechanical assembly fit snugly, they may be cemented together with an insulating cement if so desired. The glow lamp, resistor, leads, and prods are soldered together after having been properly spliced. The fiber disc (put in last) is to protect the end of the glow lamp. ★

Bill of Materials

No.	Quan.	Material and Dimensions, etc.
1	1	Fiber disc—¼ D x 1/16"
2	1	Fiber tubing—⅝" O.D.-¼" I.D. x 2½"
3	1	Fiber tubing—½" O.D.-⅜" I.D. x 15/16"
4	1	Fiber rod—⅜" D. x ½"
5	1	Neon glow lamp—1/25th watt
6	18"	Flexible copper wire—#20 insulated 3/32" O.D.
7	36"	Music wire—#10
8	1	Resistor—200,000 ohms—1/3 watt
9	3"	Plastic tubing—Insulation from #14 T.W. type wire
10	3"	Plastic tubing—Insulation from #6 T.W. type wire
11	4"	Music wire—#20



Student in the photography department of Metropolitan Vocational High School, New York City, shooting a commercial "set-up."

An answer to the questions of the "how" and "why" of offering

Photography in the School Shop

By David Rosenfeld

Chairman, Photography Department, Metropolitan Vocational High School, New York City

EVERY secondary school should provide its students with an opportunity for studying photography on either a vocational or avocational level.

Vocationally there never has been such a demand for photographic services as there is today. The growth of the tabloid newspapers and picture magazines; the extent to which industry and government are using photography in its many forms; the development of microfilm and its many uses; the widespread use of color photography and its impact on advertising; television; the invaluable and ever-increasing use of photography in medicine, science, etc., are but a few instances of the wide field open to the professional photographer.

Avocationally one need only to look at the huge amount of money—more than $100,000,000—spent each year on roll film, amateur and semiprofessional cameras, and photo finishing to realize the universal appeal of photography as a hobby. The growth of the camera clubs and in the number of photographic magazines is further evidence of the desire of these amateurs to perfect their technique.

In between these two groups is a good-sized group of engineers, salesmen, teachers, scientists, and others who because of time, circumstances, or money, cannot use the services of a profesional photographer, and must, therefore, do their own photography. To them photography is a valuable tool subject.

Despite the great growth in photography, only about 12 cities in the whole country offer vocational training in photography, and only a relatively few offer it on an industrial-arts basis. (Detroit offers photography in most of its secondary schools.)

A course in photography in our secondary schools can do much to meet the needs of all these groups. The interest in the subject makes the course almost self motivating. The questions then arise: what should such a course attempt to do, who should teach it, and

A photographic unit in the shop program makes it possible to offer services to other departments of the school. This student is making a microphotograph for the school science department.

what physical facilities should be provided.

What to Teach

Most photography books suggest starting instruction with the construction and then the use of the pin-hole camera. Today, however, many boys and girls own good cameras equipped with flash guns and fast lenses, and have long since progressed beyond the pin-hole camera stage, so that the study of the pin-hole camera is no longer the logical starting point.

It seems wisest first to teach each student the proper use of whatever camera he happens to own, and it is often surprising what excellent equipment many youngsters have. Then the modern press or the 35mm camera should be studied. The press camera is the most important camera in use today since it will do about 90 percent of the photography necessary in any school.

General instructions should, of course, cover lenses, shutters, films, filters, lighting, the processing of negatives, contact printing and enlarging, paper surfaces and contrasts, and the finishing of prints (spotting, mounting, etc.).

This brings us to the question of who should teach a photography course. There is so much physics, chemistry, and art in photography that it is often given under the supervision of one of these departments. This offers the temptation on the teacher's part to overemphasize his particular field of interest at the expense of offering the student a general approach to photography. On a high-school level only the essentials of related art and science should be attempted. While it is true that photography is a combination of art and science, the result is a new subject, and the teacher, if he is an art, physics, or chemistry teacher must remember that he is not teaching the art, physics, or chemistry of photography but photography itself. If the subject is being taught on a vocational level, the teacher, of course, should be an experienced professional photographer.

Layout and Equipment

The matter of physical layout for any school depends largely on the space available. Ideally there should be a studio, darkrooms for developing and printing, and space for retouching, spotting, mounting, etc. Adequate ventilation and water supply are a "must." The School Service Department of the Eastman Kodak Company, Rochester 4, New York, will give excellent advice on the construction of photographic shops.

Classes in photography are of as much interest to girls as to boys and offer them vocational opportunities. These students are making contact prints in the Metropolitan V.H.S. darkroom.

As to equipment, the school should have at least one modern press camera with a relatively fast lens and a synchronized flash attachment. If photography is being taught on a vocational basis, then a number of these outfits will be necessary. Accessories should include: filters for indoor and outdoor use, a tripod, several flood lamps for portrait and still-life work, and a good carrying case so that the camera and equipment may be carried easily and safely. Much of the other equipment such as printing boxes, enlargers, retouching stands, and electrical equipment may be constructed in school shops but, as a rule, it will be far better to purchase substantial professional equipment which will stand up under constant use and which will do the job more satisfactorily.

A Service to the School

A course in photography in our secondary schools not only offers the pupil an opportunity of learning valuable skills but it can also be made of great service to the school itself and so further educate the youngsters in the fields of cooperation and group living. Projects such as furnishing photographs for the school paper or magazine may be undertaken. These might cover sport events, school personalities, visitors, assembly programs, community activities, etc. Visual aids may be prepared for other classes. These may be slides, detail or construction photographs of projects, enlargements for classrooms, and in time 16mm movies and 35mm color slides will be well within reason.

Every effort must be made to guard against merely operating a photo-finishing shop for developing roll films and making duplicate prints, or any project which entails purely repetitous work and which in no way adds to the pupils' fund of knowledge. For example, photographing each member of a class where the number exceeds 100 is not a job for photography students and should be left to a professional studio.

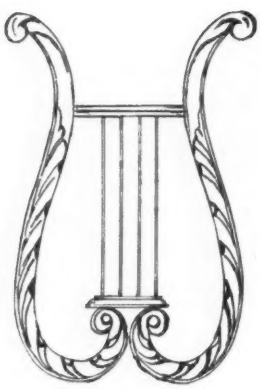
When work is done for other depart-

(*Continued on page 27*)

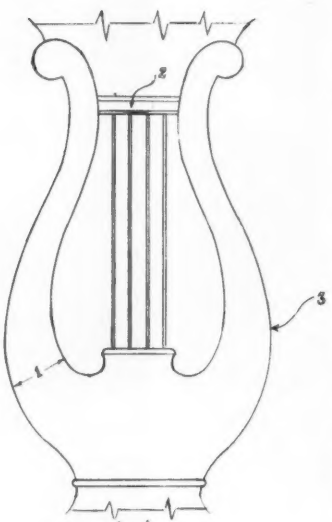
"Not Enough of Either"

Contends Lewis F. Hodges

Director of Vocational and Adult Education, Grand Haven, Michigan, Public Schools, who thinks some may take issue with his viewpoint, but his experience with furniture designers and manufacturing leads him to believe he is on firm ground.



A



AA

GOOD DESIGN

Here is depicted the lyre back of a Duncan Phyfe chair, originally measured and drawn by Lester Margon in 1945, at the Detroit Institute of Arts, and published in the book entitled *Furniture Treasures.*

This is an illustration of traditional American design at its best. The reason that Duncan Phyfe furniture continues to be popular is due to his excellent craftsmanship, his fine sense of design and proportion, and his deftness in placing ornament where it will have a telling effect.

Mr. Margon states that the delicately carved lyre is a bit of jewelry translated into wood; the brass strings are sturdy as well as ornamental, and the acanthus-leaf carving, so characteristic of the work of Duncan Phyfe, is well employed on this model.

Although the design is rather delicate for the school shop, the process of "sandwiching" plywood or veneer between two solid pieces would add enough strength to make this design practical. The wood carving would be a little more difficult, but it is not beyond the realm of the better high-school craftsman.

POOR DESIGN

This is a good example of an attempt to adapt and simplify a once very fine design into something that is adaptable to the school shop, but in the process it is quite apparent that many of the desirable characteristics have been lost. (This design is the main portion of one end of an end table as illustrated by Herman Hjorth in his book *Forty Pieces of Fine Furniture.*)

It will be noted at (1) that considerable width has been added which leads to a clumsy appearance. The lyre crossbar (2) is much too high on the lyre which throws the whole design out of proportion and tends to bulkiness or overwidth at the lower part of the lyre (3). This is contrary to good design. The upper part of the lyre should be the widest.

THE term "industrial arts" would indicate to the layman that there is at least a modicum of "industry" and "art" involved in that school activity.

A few industrial-arts teachers and many persons in industrial and artistic pursuits are well aware that there is "not enough of either." This weakness, in all probability, is most noticeable in the woodworking and cabinet-making field, although other areas are not wholly exempt from this indictment.

Although orientation in industrial practices is only one of the objectives of industrial-arts teaching, it would be folly to disregard current improvements and practices in the woodworking trade. Too often industrial-arts teachers and some teacher-trainers are unaware of present practices and up-to-date methods that are prevalent in the furniture industry.

How many teachers of woodworking are familiar with the advantages of the dowel joint? How many student users of abrasives are still struggling with flint sandpaper? Are you still in the "horse-and-buggy" days of the brush-water stain-shellac-varnish era instead of the spraygun-NGR stain-lacquer sealer-lacquer schedule? Have you explored the possibilities of "glazing" and "shading" which probably do more than any other operation to enhance the beauty of a mahogany piece? Are you acquainted with the various combinations of steel wool, pumice-stone, and wax that are used in the rubbing and polishing operations? Have you realized that colored waxes are used to emphasize certain subtle effects in wood and achieve that rich patina so desirable in quality furniture? Are your shop pupils aware of the possibilities of gold-leaf embellishments on leather as a means of enriching the appearance of a table? How many pupils have been exposed to the process of properly "distressing" traditional wood novelties to emphasize the quality of age?

In the field of "art" it is indeed deplorable that a large percentage of the projects depicted in publications used in school shops should be so unacceptable to the furniture trade and so repulsive to the furniture designer. Most craftsmen derive more inspiration and guidance from the local museum, the department store, or newsstand magazine with an architectural or homemaking slant than they do from books of "canned" projects.

B

GOOD DESIGN

This planter end table (the two recesses in the top receive a copper planter—a good general shop project) illustrates how good design, as depicted in *A*, can be adapted to a project which is not beyond the scope of a good high-school woodworking class.

This project is similar to one designed by a Grand Rapids furniture designer.

BB

POOR DESIGN

This drawing is a copy of the end table mentioned under *AA*. The fine lines of the true lyre are lost because they are allowed to flow into the feet rather than remaining as an entity in themselves. The shield applique on the lower part of the lyre detracts rather than adds to the design and is a type of ornament that cheapens the piece. "Borax" furniture is the term used by the trade to classify cheap furniture which is often overdone with ornaments and lacks the fine characteristics of good furniture.

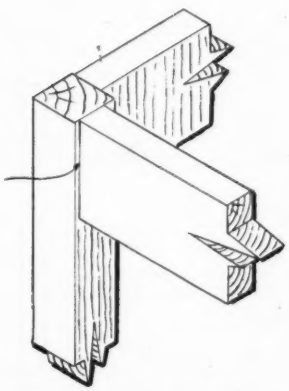
Many pieces of furniture designed by, or for, industrial-arts students are much too heavy. Critics have stated frankly that while these pieces might have been honestly constructed they are, in the first place, too heavy to be moved about the home with ease; and, in the second place, they represent a decidedly uneconomical use of that valuable material, wood. The fact that furniture must be simplified to some extent to make it adaptable to school processes does not necessarily mean that the project must be clumsy or heavy. Perhaps many of us have been overly influenced by our West Michigan environment, but that "Grand Rapids look" can be imparted to any piece of woodcraft with a little planning and forethought.

With very little effort, wood turnings with that totem-pole expression can be changed to crisp, delicate, well-proportioned pieces of which an Adams or a Phyfe would be proud. Good design in turnings, once having been established, should be properly preserved with the judicious use of sandpaper. More wood turnings have been ruined because of an overabundant use of sandpaper than because of the lack of it.

Generally speaking, the American people as a whole are acquiring a better appreciation of the beauty and refining influences of good furniture. This broad statement is accurate in that it reflects the cultural growth of our nation. Modern taste in furniture, as in music and in literature, is founded on a fairly widespread understanding of fundamentals. Are we, as teachers of industrial arts, standing in the way of cultural development by not teaching these fundamentals? Good furniture is furniture designed along certain lines of harmony and symmetry which will be beautiful always, and furniture so designed is independent of transitory style preference. Yet we are often guilty of conceiving and perpetrating a monstrosity that is suitable only to a place at the cottage, the attic, or the kindling pile.

To a few master-teacher-craftsmen, the above does not apply—may God bless 'em—but in many cases a little more "industry" and a little more "art" injected into "industrial arts" will remove the stigma of "not enough of either." ★

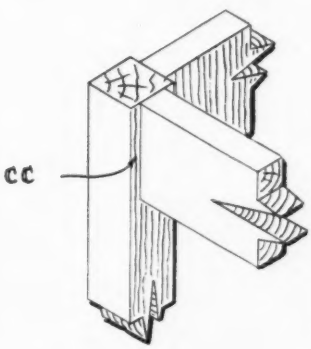
C



GOOD DESIGN (Table Leg—Table Rail)

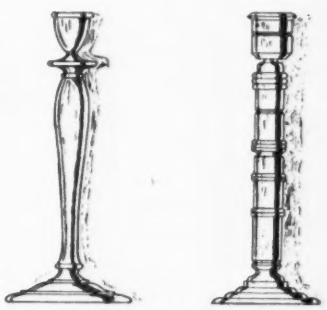
In drawing C the top of the leg extends or projects only 1/16" to 1/8" beyond the rail. This small projection is considered good design, particularly in traditional furniture. In modern furniture, the leg is sometimes flush with the rail.

CC



POOR DESIGN (Table Leg—Table Rail)

The cut-away portion of a table illustrated at CC is poor in design because the projection of the leg beyond the rail of 1/4" to 3/8" is much too great, but nevertheless is seen many times in school-shop construction.



D DD

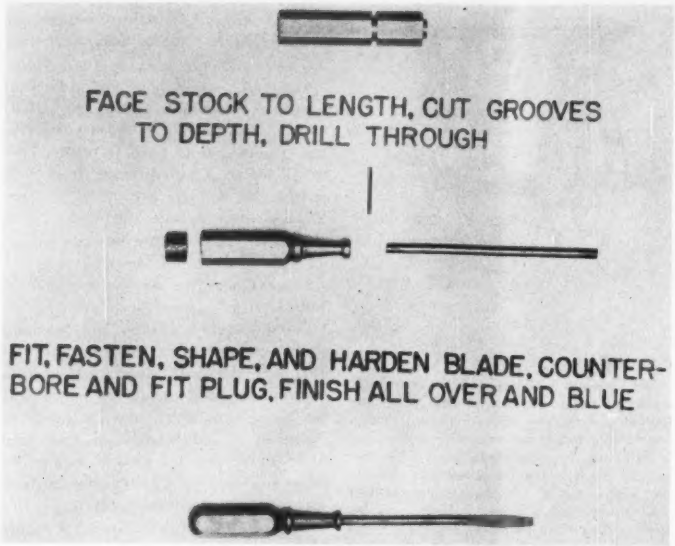
GOOD DESIGN

Both *D* and *DD* drawings of candlesticks are taken from *Industrial Arts Design* by William H. Varnum.

D represents a correctly designed candlestick with outline enrichments grouped in accordance with good design practice. (If the primary mass is divided into three horizontal divisions, the dominance should be placed in the center section with varying widths in the upper and lower thirds.)

POOR DESIGN

DD is a typical faulty design violating proportionate grouping and continuity with lack of contrast. The result is an undesirable monotony of contour.


FACE STOCK TO LENGTH, CUT GROOVES TO DEPTH, DRILL THROUGH
FIT, FASTEN, SHAPE, AND HARDEN BLADE, COUNTER-BORE AND FIT PLUG, FINISH ALL OVER AND BLUE

Students use the above visual aid plus a single sheet on which are the blueprint and the set of procedures to make this all-metal screwdriver a virtual selfteaching machine-shop project.

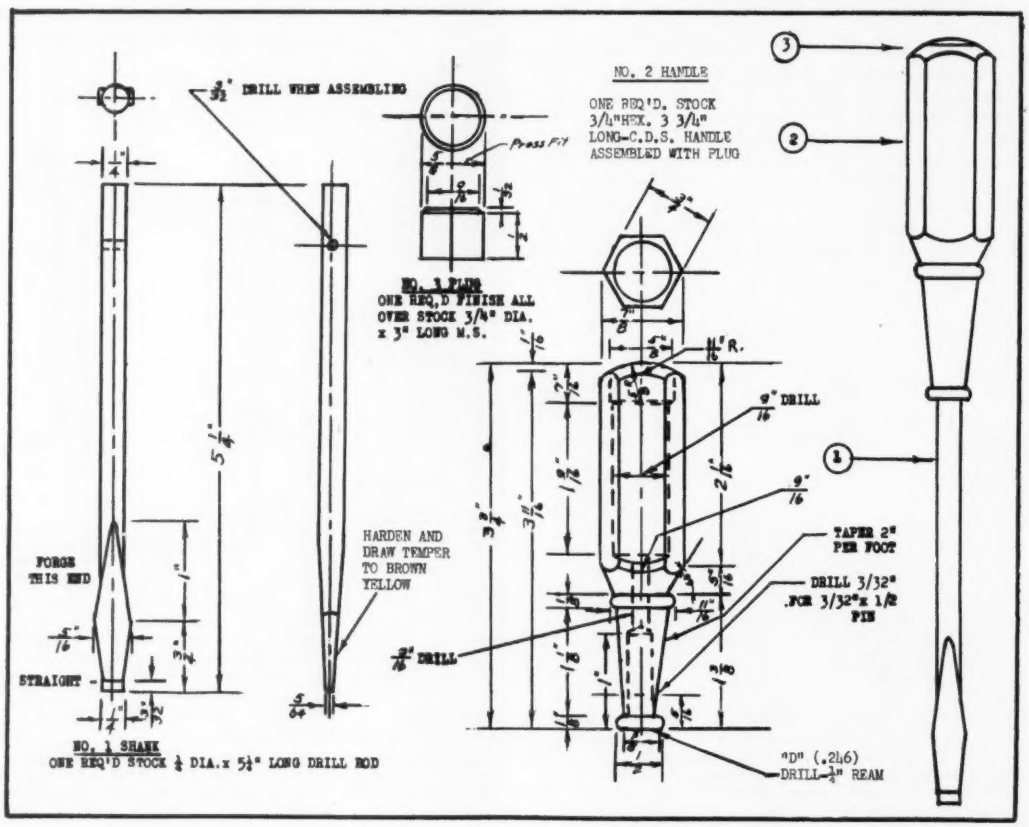
All-Metal Screwdriver

By Claud L. Booth

Anaheim Union High School,
Anaheim, California

THIS project has been worked out as a "package deal" for students learning lathe work. The drawing and the procedure sheet are blueprinted on a single sheet which is pasted to a piece of stiff cardboard. A couple of coats of lacquer are applied to the print for protective purposes.

When the student is ready for this project, the complete print and procedure sheet is checked out to him so that he has the information he needs to work out the project. By this method, time is


NO. 2 HANDLE
ONE REQ'D. STOCK 3/4"HEX. 3 3/4" LONG-C.D.S. HANDLE ASSEMBLED WITH PLUG
DRILL WHEN ASSEMBLING
Press Fit
NO. 3 PLUG
ONE REQ'D FINISH ALL OVER STOCK 3/4" DIA. x 3" LONG M.S.
1/8" R.
9/16" DRILL
TAPER 2" PER FOOT
DRILL 3/32" FOR 3/32"x 1/2 PIN
HARDEN AND DRAW TEMPER TO BROWN YELLOW
FORGE THIS END
STRAIGHT
NO. 1 SHANK
ONE REQ'D STOCK 1/4 DIA.x 5 1/4" LONG DRILL ROD
"D" (.246) DRILL 1/4" REAM

saved for both instructor and student who has all the information right at the lathe.

The project has many learning fundamentals included in its construction. The student will gain experience on the lathe in facing, drilling, taper turning, chamfering, filing, and polishing. He will also learn to make press fits and to forge and temper the blade.

The finished screwdriver is a substantial tool and will stand reasonable pounding on the handle as well as wrench tension.

With slight modifications, a complete set of screwdrivers can be made from this design.

Procedure:

1. Select stock ¾" x 4" hex. c. r.
2. Put in three-jaw chuck. Take facing cut. Drill through with 3/16" drill, using slow direct speed. Use cutting compound. Be sure drill is tight and sharp.
3. Lock carriage. Set compound rest to proper taper (95° right) with handles toward tailstock. Cut two ⅛" raised ridges with 1⅛" taper between.
4. Set compound rest at 60° and cut 5/16" taper section.
5. Drill from end with "D" drill. Ream to ¼" or press fit for blade (.001" to .002").
6. Reverse stock in chuck and face to length 3¾". Drill 9/16" hole 2-1/16" deep. With boring bar, bore to ⅝" less .010, 7/16" deep. Ream to ⅝".
7. Machine blade insert to within .001-.002 of hole in head for handle. Press blade 1" to shoulder. Drill through handle and blade with 3/32" drill. Lock with ½" x 3/32" pin.
8. Heat blade in forge. Shape and temper blade.
9. Take a piece of soft stock. Turn to .001-.002 over ⅝". Press or drive into hole in handle. Part extra stock from plug. Chamfer end of handle as per blueprint.
10. Carefully file the whole tool and polish with emery cloth for a good finish.

Key

Drill Rod—Tool Steel, "Cold Drawn"
M. S.—Machine Steel
C. D. S.—Cold Drawn Steel
F.—Finished Surface ★

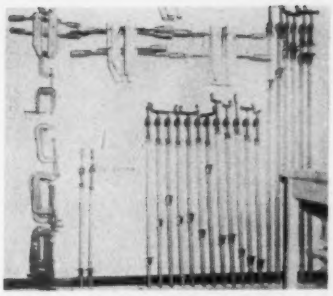
What's New?

You'll find out in SCHOOL SHOP's big Special Directory Number (April Issue). It will be filled with pictures and stories of the newest school shops being built today. Plenty of ideas for improving your own shop or to use in the new one that's to be built.

Housekeeping is helped with these

Clamp Racks

By William F. White
Union, New Jersey, High School



Minimum space is needed for these clamp storage racks. Note that bar clamps rest on the floor.

NEAT and handy storage of clamps is a problem that confronts many teachers of woodworking. The problem becomes greater if you are teaching in a shop where floor space is at a premium and where manufactured racks take up too much room.

Faced with this problem, I decided to utilize a small wall area in the finishing room of the shop to accommodate all of the clamps. The bar-clamp rack shown in the photograph and the drawing was designed so that the entire weight of the clamp would be placed on the floor and clamps of the same size would be kept together.

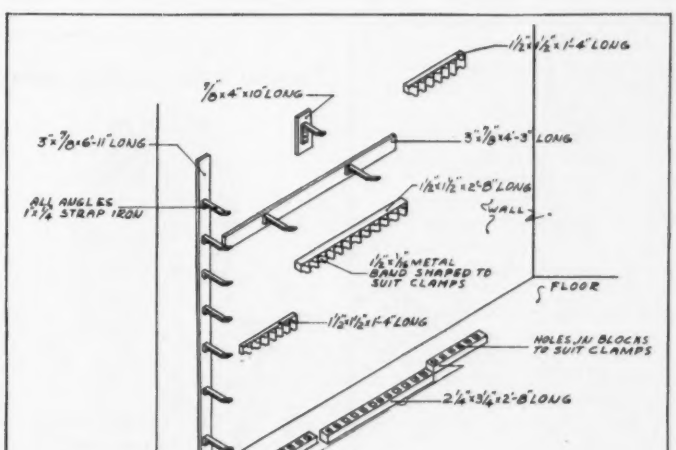
Some of the advantages of this type of rack are:

1. The teacher can easily see just how many clamps of the various types are in use at the same time.
2. There is only one way to place the clamps in the racks.
3. The clamps are easily accessible to the students.
4. Construction and installation of this type of rack is relatively easy.

The racks for the hand-screw and C-clamps presented a problem in space utilization and in orderly storage of the various sizes. Strap-iron hangers seemed best suited for the purpose and could be easily made in the shop. We used ¼" x 1" iron, bent at a 90° angle and drilled for screws for fastening to the wooden supports. The tip of each hanger was bent up to prevent the clamps from slipping off. The hangers were mounted so that there was plenty of room for each size of clamp.

This arrangement can be easily modified to suit the needs of the individual shop and the space and numbers of clamps to be handled.

This set of racks has been in use for several years and has proved very satisfactory. They are strong enough to withstand the wear and tear given them by students. Moreover, the shop looks 100 percent neater since they were installed. ★



Alternating pieces of walnut and acrylic plastic are used for decorating this little lamp.

Students collaborated in designing this

Plastic Boudoir Lamp

By Arthur W. Bentz

Freehold, N. J., High School

THE purpose of this project is to teach pupils how to work with wood and plastic and to teach the proper tool processes and procedures. Another consideration is that this project uses up the small pieces of wood and plastic that accumulate in the general shop.

The lamp in this article was designed by the cooperative efforts of the instructor and the members of his classes. A model was presented to several of the classes. Each person was asked to look over the model carefully and give his opinion of the lamp as to design. Suggestions were received and noted by the instructor. The most frequent suggestions were used in a redesign of the original. Another model was made incorporating the new features and an operations sheet was made up as follows:

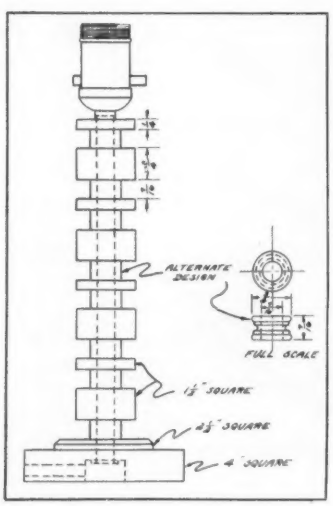
1. Cut wood for the base and square to size ¾" x 4" x 4".
2. Cut wood for spacers ¾" x 1½" x 6½". Plane edges smooth and cut into four squares, ¾" x 1½" x 1½".
3. Cut one piece of ¼" plastic and square to size 2½" x 2½". Do not remove protecting paper until ready for assembly. Sand edges with 4/0 sand paper, using a block to produce ⅛" chamfer.
4. Cut another piece of ¼" plastic 1½" x 6¼". Sand edges carefully and cut into 4 squares 1½" x 1½". Sand the cut edges.
5. Locate the centers on the face side of each piece of wood and plastic and bore a 27/64" hole through each piece.
6. Counter bore the base with a 1" Forstner bit ½" deep on the bottom face. Also bore a 5/16" hole through one end of the base to meet the counter-bored hole.
7. Sand all wood parts and fill and lacquer or finish in any other chosen way.
8. Steel wool all edges of plastic pieces and buff to produce clear, scratch-free surfaces. Wax if desired.
9. Cut brass collars from ¾" round brass 7/16" long and bore 27/64" through the centers. Angelo Bros. part #327 may be substituted for brass collars or pieces may be turned on engine lathe to any desired shape.
10. Cut a piece of ¼" iron pipe to proper length and thread both ends ½" with ⅛" pipe thread.
11. Remove all paper from plastic parts and have all wood parts well rubbed and waxed.
12. Assemble as shown on the drawing, using ⅛" lock nut on bottom of pipe and a standard brass shell; push through socket on top to hold all pieces in place.
13. Wire with 8' of #16 plastic or silk covered parallel lamp cord and a standard two-prong plug cap.

Stock List

1 pc.—¾" x 4" x 4" walnut
4 pc.—¾" x 1½" x 1½" walnut
1 pc.—¼" x 2½" x 2½" Plexiglas
1—⅛" pipe lock nut
4 pc.—¼" x 1½" x 1½" Plexiglas
8 pc.—¾" d x 7/16" brass rod or Angelo Bros. part number 327
1 pc.—⅛" pipe, 8¾" long

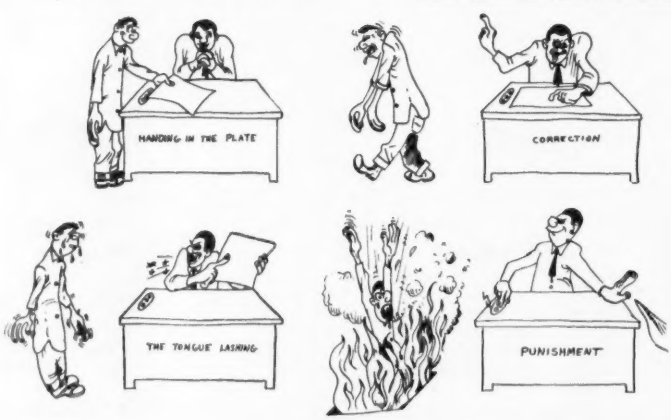
The procedure list does not do away with the teacher and it should be remembered that proper instruction must be given to the pupil about the drilling of plastic. Also, it may be wise to make a jig for the drilling operations if there are a large number of these projects made in the shop.

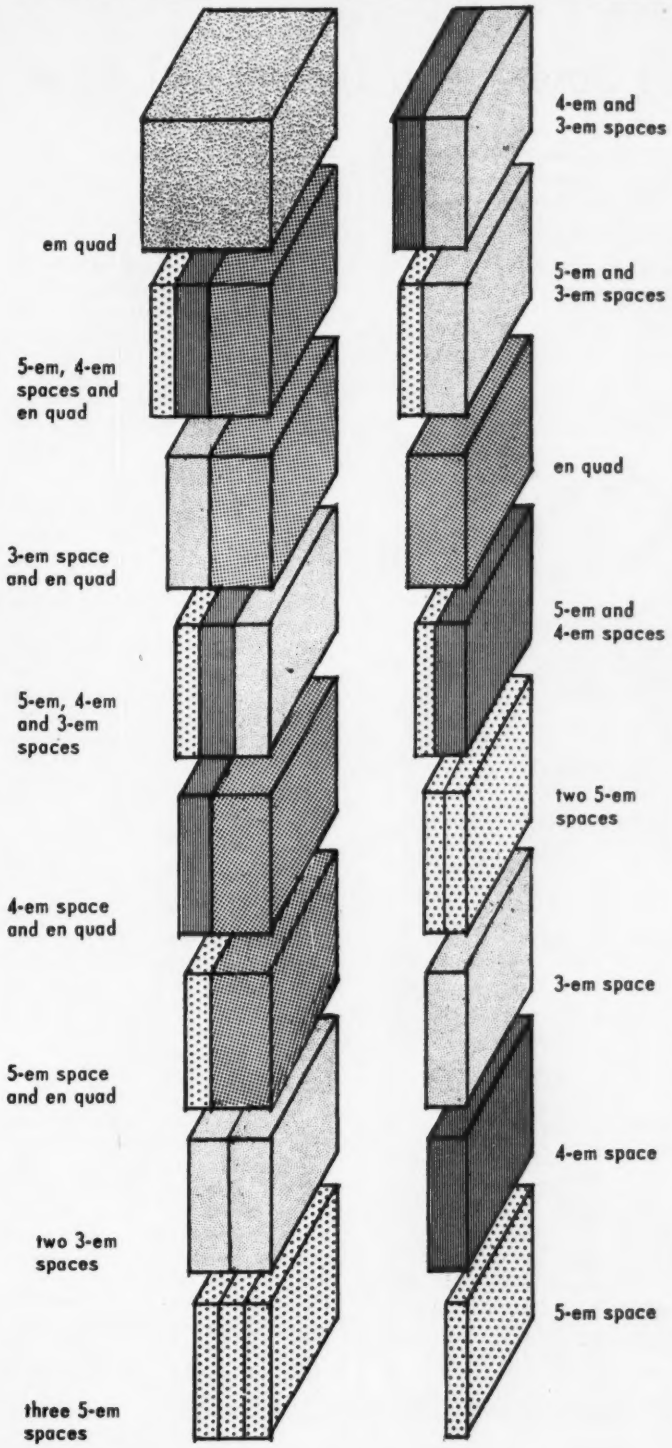
This project is an "interest getter" and in keeping with the varied activities in a general shop. Also, the project may be made by beginning shop pupils or advanced pupils depending on whether the manufactured collar is used or if they are to be turned on the engine lathe. ★



Turning in the drawing plate

By Richard Turney, former student, Chino, California, Vocational School





How to Combine Spaces and Quads for Proper Line Justification

By R. Randolph Karch

State Department of Public Instruction, Harrisburg, Pa., and author of *Graphic Arts Procedures, Basic Lessons in Printing Layout, How to Recognize Type Faces,* etc.

THE accompanying visual presentation of the relative thicknesses of spaces and quads will convey necessary information to the student more quickly than will the actual spaces and quads themselves. The chart is large enough to be seen, but the actual spaces and quads, in the 10-point size, are microscopic when differences in thicknesses are looked for.

The chart will illustrate the small differences between the thicknesses and combinations of spaces and quads, which will teach correct justification of lines in the composing stick.

When increasing space between words, the normal procedure is to substitute an en quad for a three-em space. Very often this procedure does not work out, because a three-em space makes a line loose, and the en quad makes the line too tight. The illustration shows *two* combinations of spaces, which are between the thicknesses of the three-em space and the en quad: the five-em and four-em, and two five-em spaces. Also if a line of type is slightly over length for correct justification, the five-em and four-em spaces (together), substituted for an en quad already in the line, will bring about better justification.

Placed where students can see it, this chart will help learning difficulties, and solve student problems before the students contact the instructor for help. ★

[NOTE: Reprints of this page can be secured for class notebook or bulletin board use from SCHOOL SHOP, Ann Arbor, Michigan, for 5c each in quantities of 10 or more.]

Just as important as the science of teaching industrial arts is

The Teaching of Science in Industrial Arts

By Lynn W. Caufman
Industrial Arts Teacher
Harborcreek, Pennsylvania, High School

WHEN you think of yourself as an industrial-arts teacher, do you consider yourself just as an instructor of the manual skills involved in shop work? You are much more, you know. You are actually a composite of nearly all the teachers in your school.

The industrial-arts field includes phases of such related subjects as English, mathematics, spelling, history, and science. All of these enter into the picture. Of them all, probably the most closely related subject is science. From the very beginning, when the youngster is first introduced to industrial arts, you use the fields of science to explain many of the phases of wood shop, machine shop, sheetmetal shop, and the other shop areas.

Take wood shop, for example. When the student begins his course, you teach botany. The study of trees, how they are constructed and how they grow is purely botanical. When you let the student examine a cross section of a log in the classroom, he becomes familiar with the bark, the cambium layer, the annual rings, the medullary rays, the pith, and the evidences of spring and summer growth. He learns the difference between hard and soft wood and open and close grain so that he may understand why practically every kind of wood is especially suited for certain purposes.

The student learns that the manner in which he works on a piece of wood is determined largely by the kind of wood and its characteristics. The formation of the grain determines the direction of the cutting and forces him to use certain recommended procedures when boring operations are called for.

Even when the project nears the completion state, you are called on to use science in your teaching. The methods of putting a finish on a piece of wood require a working knowledge of certain scientific facts. Your pupils learn that the types of materials used in the finishing process—stains, fillers, oils, varnishes, waxes, and paints—all bring out certain chemical and physical changes that are desired in the finished product.

Science still plays an important part when the project is finished. Many chemical and physical changes will continue to take place in the wood and in its finish. This determines one of the most important features of the project,

(*Continued on page* 24)

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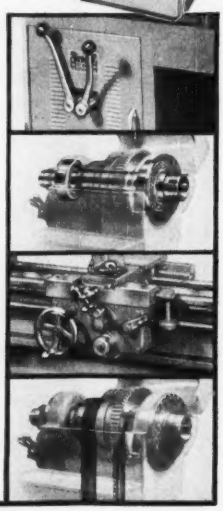

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Science. . . . . .

from page 22

its lasting quality. By this time, your student realizes that the piece of wood on which he has been working has an important scientific background.

In the study of tools and machines your student obtains a working knowledge of the basic chemical and physical properties of the various kinds of metal. Since different metals have different qualities of strength, weight, and appearance, the student learns he has to use them in recommended ways. He learns why certain metals are used when he wants a spring, or when he wants a particularly hard surface, or when he wants a piece of metal combining strength with light weight. All of these characteristics of metal have chemical and physical explanations.

The ability to sharpen the numerous cutting tools is almost a science in itself. When cutting edges are placed against an abrasive wheel certain reactions take place that can completely ruin the tool if the operator does not have the proper training and skill. For example, the temper of a piece of metal, a chemical characteristic, must be preserved in a tool that is being sharpened. If the student understands the theory of tempering, he will know how to preserve it.

In the sheetmetal shop, you use science to teach the student how to protect the surface of the metal against rust and corrosion. He learns that when a piece of sheetmetal is put through a process such as galvanizing, the surface of the metal is able to withstand the effects of moisture and weather for an amazingly long period of time.

Science also is called on when you teach your student how to solder two pieces of galvanized metal together. He must know the proper chemical to use so that the solder will not be repulsed by the galvanizing. He must know the correct chemical treatment for his soldering copper that will keep it in good working order. Soldering itself is a chemical operation.

When the study of machinery is undertaken, the subject of physics comes to the foreground. Levers, wheels, and gears are the basis of all machines. If the student is to learn the "how" and "why" of the machine, you must teach him the theory of the lever, the wheel, and the gear. He must understand how power is transmitted from its source, which is the motor. He must learn that various types of work demand various speeds from the machine, and he must understand the theory of speed-change and be able to put the theory into practice.

While the shop student may not be aware of the fact that he is studying science as a subject while he is in your shop, he will nevertheless learn many scientific aspects that will carry over from the shop class into other classrooms and into his outside life.

An outstanding feature of the science education that the student receives in your industrial-arts shop is the practical manner in which it is usually presented. The phases of science that he must learn are normally placed before him in object form. He is able to handle the cross section of the log so he can see for himself just how it grew. He is able to examine carefully the different metals and see their different characteristics. He is able to watch the machines in operation and get a practical demonstration of some of the principles of physics he has learned.

The student, in other words, is "learning by doing," a method of learning that is now recognized as the best way to learn. Industrial arts and science together will properly prepare today's youth for tomorrow. ★

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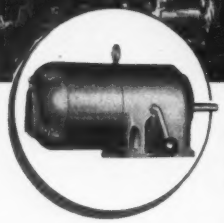

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VIC Vocational Industrial Club of Texas

By Richard E. Morley
San Antonio Vocational and Technical School, San Antonio, Texas

Emblem of Vocational Industrial Club of Texas
The axle represents the divine and natural forces around which all things revolve.
The hub represents the individual.
The five-pointed star represents home, school, industry, community, and Texas in which members work cooperatively in the production of goods for the service of the people.
The triangle represents knowledge, experience, and skill—the three elements necessary to provide for the needs in life.
The gear represents the binding circumference of the whole of life with the gear teeth representing individuals bound together in their effort for more efficient work.

GOOD local public relations by the school, the shop, the instructor, and the students are admittedly a must for an effective vocational-industrial training program.

The student is by far the most effective medium for good community relations. What he says, what he does, and his attitude toward the school are determining factors in a good community-wide public-relations program.

The school-shop club is one of the best tools to use in building such a program. There are many projects and activities undertaken in industrial-education classes that could be publicized much better if they were carried on under the recognition and sponsorship of a shop club.

The Vocational Industrial Club of Texas is just such an organization on a state-wide basis. There are local chapters, combining within their respective areas to form district chapters. Representatives from the district make up the state chapter.

This club, better known as VIC, is state sponsored through the Texas State Education agency with Leland B. Luchsinger as state sponsor and offices at the University of Texas, Austin.

This state-wide club is designed for all students enrolled in trade and industrial and industrial-cooperative training classes in the public schools of the state. Through its state-wide activities it enables industrial-education students to enjoy a closer relationship. A carefully planned state-wide program is carried out that has proved attractive to young people.

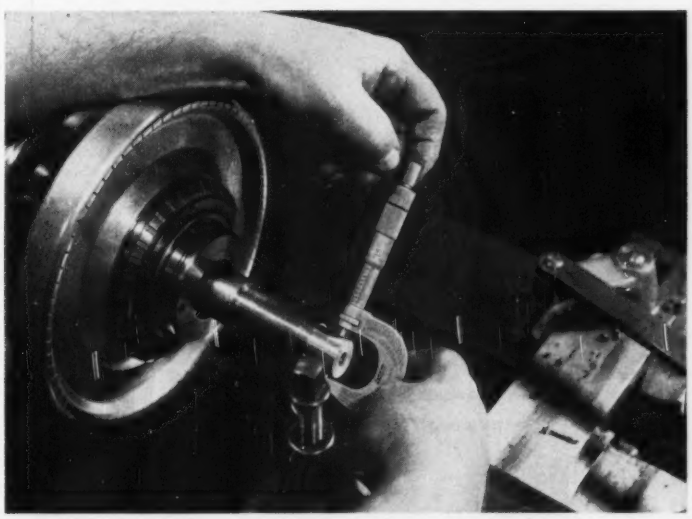
The club is now in its sixth year with enrolment increasing each year until the present membership is well over the 1500 mark. Industry is becoming more and more interested in the program and is making awards for outstanding club and individual work.

A typical local club is the Tech Graphic Arts Club of San Antonio Vocational and Technical School. This club is affiliated with the Vocational Industrial Club of Texas as VIC Graphic Arts Chapter No. 79.

In a carefully mapped out program for the year, set up under the direction of the executive committee of the club and the author as sponsor, the Tech Graphic Arts Club has contributed its part to a very successful year in Tech's public-relations program.

(*Continued on page* 32)

ON THE JOB YOUR STUDENTS WILL USE LUFKIN TOOLS



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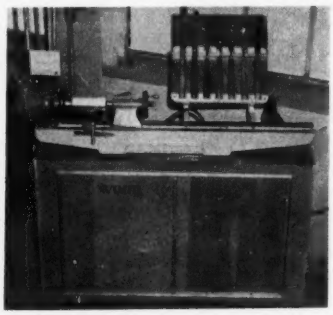
Cleaning Old Paint Brushes

A simple and practical method of cleaning paint brushes which are filled with a large amount of old paint is first to soak them in lacquer thinner or varnish remover. When the bristles are softened, they should be wiped dry with a cloth. The old paint can then be removed easily with a medium-sized wire buffing wheel. It can also be removed from the ferrule and the handle by the same method. Be sure to wear goggles when using the wire wheel.—*Claire Floutz, Lakeview Junior High School, Battle Creek, Michigan.*

Modernize Your Lathes

A wooden cabinet built around the legs of an old machine improves its appearance and makes useful space available for storage of projects and of various lathe parts. The cabinet in the photograph has sliding doors for easy accessibility and keeps lathe parts with the machine. Shelf space is also available for holding projects until they are completed.



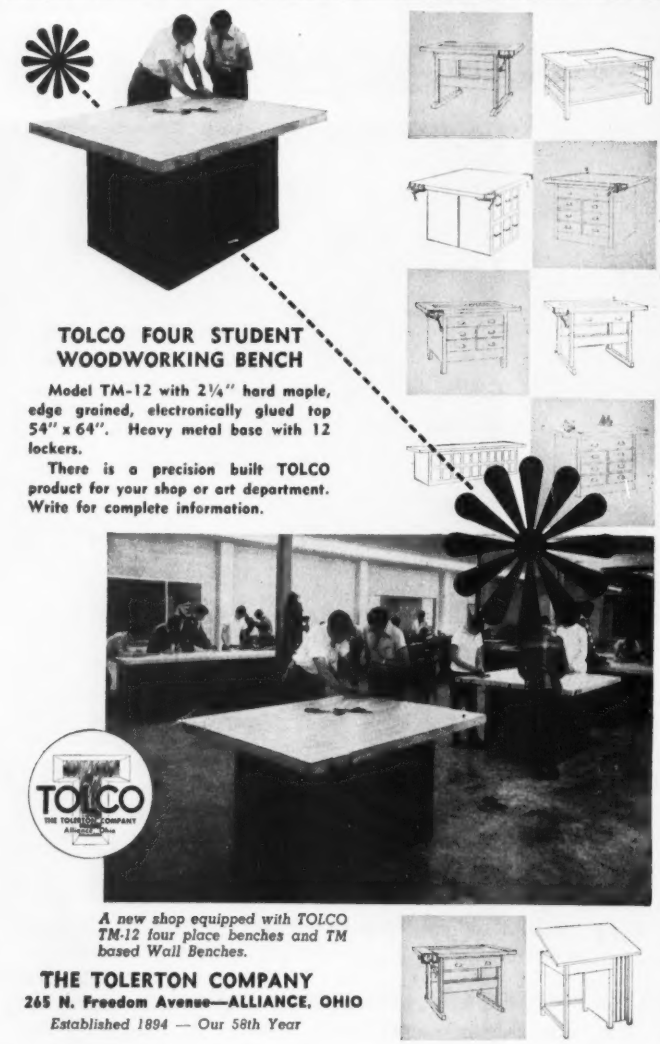
Note the convenient tool rack which keeps students from laying tools on the bed of the lathe from which they often fall to the floor. The tool rack is held by brackets bolted to the bed of the lathe. —*Norman V. Nichols, New Hartford, N.Y., Central School.*

Save the Set Screws

Small set screws in drawing instruments sometimes drop out and are lost when the instruments are used by curious but inexperienced drafting students, resulting in a shortage of usable instruments. Lightly peening the through end of the set screw with a jeweler's hammer will prevent most of these losses. The same method has been used successfully with wing dividers used in sheetmetal work.—*Wilbur R. Current, Huntington, West Va., East High School.*

Clip the Wool

Instead of allowing students to pull out steel wool from a roll as needed, thus messing up the roll and scattering wool about, I have found it a good plan to cut strips of steel wool with snips to various sizes and place them in a tin or handy container where students can easily get the size they need. This method results in no waste, no stress, and no mess.—*Edward M. Myslivecek, Garden City, N.Y., High School.*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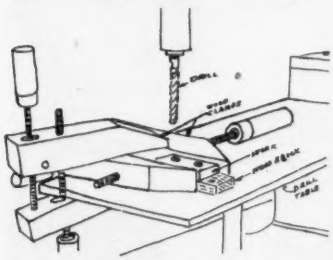
Substitute Vise for Drill Press

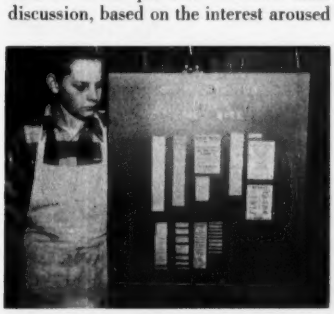
Lacking a regular vise for a drill press, I utilized two wood clamps to hold the work in position (see sketch). A piece of wood was placed under the work to position it at the top of the clamp for easier working and to protect the drill-press table. This method



can be used satisfactorily when the regular vise is in use on another machine but care must be taken that the clamps do not obstruct the operator's vision or get in his way.—*R. M. Woodbury, Wellesley, Mass., Public Schools.*

Ads Stimulate Interest

"Help Wanted" advertisements from the classified section of the local newspapers, mounted for class and school display, are valuable for guidance and discussion purposes in trade classes we have found. The student librarian in the class in wood model making clipped a number of these ads and mounted them on a 24" x 32" piece of Masonite. Class discussion, based on the interest aroused



by the ads, covered such topics as pay rate, benefits for workers (some of these listed by skill-starved shops make the teacher think twice!), demand, permanence of job, shop location, and skills required. Because the points covered real-life situations, the discussion was timely and authentic.

Ads seeking help in cabinet making, carpentry, and millwork were included as well as those in model building.

After the class had used the board, it was put on display in a hall cabinet to attract potential trade students because of the evidence of demand for the skills taught in the department. — *J. James Hasenau, Chadsey High School, Detroit, Michigan.*

Potpourri

On a shelf in the shop I keep a can for miscellaneous screws, bolts, washers, etc., that cannot be sorted and put with other similar materials. These come in handy when odd sizes are needed. Or sometimes a boy wants one to take home and he can find one he can have for free. — *W. P. McNeer, Barbourville, West Virginia, Junior High School.*

Photography . . . . *from page 15*

ments or units in the school, charges covering the cost of materials plus a small amount to help build up a reasonable fund to pay for minor repairs and for the purchase of materials for future assignments will have to be worked out.

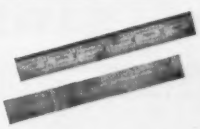
I have not attempted here to outline a course of study or to go into details of any kind but merely to suggest that there is a definite need for photography courses in our secondary schools which has not been met up to this time. The opening of this field of photography will offer a very satisfying and valuable course for our pupils. ★

FOLLOW THESE RULES and you can't go wrong

Starrett STEEL RULES

English Pattern Rule No. 414
A general utility, tempered steel rule with easy-reading bold figures and heavy markings. Ideal for school and woodworking shops. Lengths from 1 to 6 feet.

Flexible Steel Rule No. 305
A good rule for students and apprentices with quick reading 32nds and 64ths on one side and table of fractions and decimal equivalents on the other. 6" length, ¾" wide, 3/64" thick.



Flexible Steel Rule No. 306
Similar to No. 305 except with table of letter and drill sizes on reverse side. 6" length.

Tapered End Rule No. 328
Graduated in 64ths and 32nds with tapered end for measuring in holes, slots, recesses. 6" length.

Hook Rule and Drill Point Gage No. 22C
Serves as pocket rule, hook rule or drill point gage. 6" length. Graduated with 8ths, 16ths and quick reading 32nds and 64ths.

FREE "Helpful Information For Students and Apprentices"
A valuable aid in class instruction, written and edited especially for shop students. Write for your copy. Address Dept. 11.

Starrett
SINCE 1880
WORLD'S GREATEST TOOLMAKERS

THE L. S. STARRETT COMPANY
Athol, Massachusetts, U. S. A.

Buy THROUGH YOUR INDUSTRIAL DISTRIBUTOR

The Saws You Want

at the prices you want to PAY!

RETAIL SELLING PRICES For Rip, Cut-Off, Easy-Cut and Combination Saws

6" - $1.75	8" - $2.15	10" - $3.15
7" - 2.00	9" - 2.65	12" - 4.35

Supplied with Round or Special Shape Holes

As listed in Simonds Catalog "B"

SIMONDS
SI-CLONE
SAWS

Best buy in years for home-workshoppers, contractors, and schools . . . these *guaranteed* saws of Simonds famous quality. 13 types, including carbide-tipped, dado heads, and metal-cutting saws, up to 12" diameter, with round or special-shaped center holes for all electric hand saws. Look at these prices . . . and try to beat them at Simonds quality level! Drop in on your hardware dealer today . . . tell him you "want to see Simonds SI-CLONE line."

Guarantee

Made of SIMONDS STEEL fully guaranteed against any defect in material or workmanship.

SIMONDS SAW AND STEEL CO.

FITCHBURG, MASS.

Factory Branches in Boston, Chicago, San Francisco, and Portland, Ore. Canadian Factory in Montreal, Que.

Diamond Dust

Abrasive comments from that doughty Scot, Tom Diamond, former head, Department of Vocational Education, University of Michigan, Ann Arbor.

Standards of Accuracy

ACCURACY, we noted recently, is relative and the standards of accuracy in some of the work being produced in our industrial-arts shops vary widely. For example, in a pamphlet which we received from a school print shop we found seven errors in eight consecutive lines of text. If there are any teachers who believe that a job of this kind should have been free of errors, then we have a variation in standards from zero to seven mistakes.

Another case came to our attention in which a teacher had proudly mounted on his display board a beautifully finished pattern. Unfortunately, on closer examination, the fact was revealed that it would have been impossible to draw it out of the sand without destroying the mold.

Again there was a small motor on exhibit in another school which, when put through a simple test, refused to work.

It is conceded that these are isolated cases but they serve to raise the whole problem of accuracy in our school shops. Should it vary with the type of work? Should it be held to the close limits prevailing in industry? Or should allowance be made for the immaturity of the pupils? If so, what should that allowance be?

As you reflect on the problem do you recall having had the experience of frustration that comes to one when the only wrench available is too small for the job you have to do? Or have you ever needed a few half-inch brads when the only fasteners you can find in the joint are 10d nails?

Then let us not forget the individual who, with the aid of his trusty rubber ruler, can extend a 6" bass into a keeper.

The golfer, too, has his standards of measurement. As a rule he is unable—or unwilling—to count above six.

So we find that the question of accuracy in any situation depends on the nature of the activity and the conditions surrounding it. The wrench should fit the specific job. The brads would be suitable in one situation, while the 10d nails would fit an entirely different one. Again the standards of the fisherman are just as elastic as his conscience. In golf there are those who have neither

(*Continued on page 38*)

YOU BUILD EICO KITS IN ONE EVENING- but they last a lifetime... and you save 50%

24 INSTRUMENTS - the Industry's most complete line of MATCHED TEST INSTRUMENTS

¼-million EICO Instruments are now in use the world over! That's the proof of EICO's leadership in **Value.**

For latest precision engineering, finest components, smart professional appearance, lifetime performance and rock-bottom economy—see and **compare** the EICO line **at your jobber's** today **before you buy any higher-priced equipment!** You'll agree with over 100,000 others that only EICO Kits and Instruments give you the industry's greatest values at lowest cost.

Write NOW for FREE latest Catalog SS-2

Laboratory Precision at Lowest Cost

Prices 5% higher on West Coast.

EICO Reg. U.S. Pat. Off.

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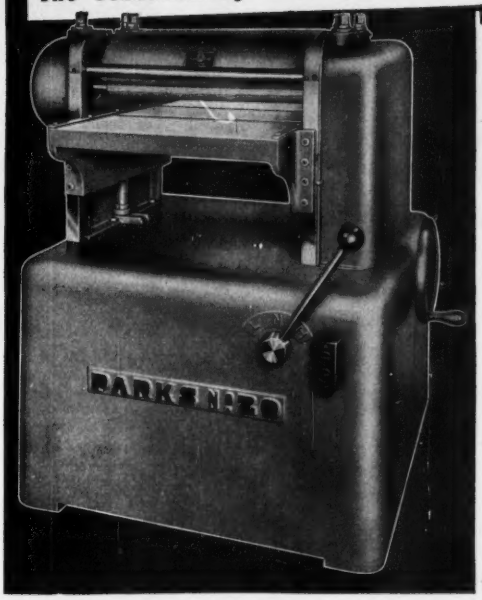
ELECTRONIC INSTRUMENT CO., Inc.

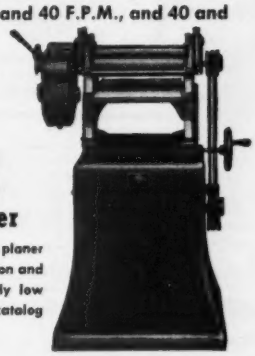
84 Withers Street, Brooklyn 11, N. Y.

The Sensationally NEW Low-Priced



PARKS No. 20 20" PLANER

Here is a modernly designed, rugged, high-speed, low-priced planer that is ideally suited for every shop and industrial plant requiring a quality surfacer. The Parks No. 20 Planer has a four-knife cutterhead with a speed of 3600 R.P.M. and offers two feed speeds—20 and 40 F.P.M., and 40 and 80 F.P.M. Write for complete descriptive literature.



The PARKS Heavy-Duty 12" x 4" Planer

A compact, sturdy, thickness planer that offers mill planer precision and ruggedness at a sensationally low price. Write for descriptive catalog sheet.

The PARKS WOODWORKING MACHINE CO., Dpt.24-A22, 1546 Knowlton St., Cincinnati 23, O.

Harper Electric Kilns

contribute to the **BEST CERAMIC TRAINING**

6 Cubic Foot Kiln for classes of 100-250 students

BECAUSE they provide a wide temperature range within which all types of high temperature and low temperature Ceramic ware can be properly fired.

BECAUSE they are clean and noiseless to operate and are as safe to work as an electric range.

BECAUSE they are expertly designed and sturdily constructed to operate dependably for many years with a minimum of maintenance.

Leading SCHOOLS and UNIVERSITIES are using Harper Electric Kilns in their Ceramic Departments to provide their students with the finest Ceramic training and also because they have found Harper Kilns to be more economical to operate in the long run. **Write for descriptive literature and prices on a Harper Electric Kiln to meet your Ceramic Department requirements.**

HARPER ELECTRIC FURNACE CORPORATION

DEPT. 14, 39 RIVER STREET, BUFFALO 2, N.Y.

Tannewitz MODEL "XJ" MITRE SAW

SAFE—ACCURATE—CONVENIENT!

CHOICE OF 5 TABLES

The newest and finest development in mitre saw benches is the Tannewitz "XJ" which allows you to select just the type of table you prefer. It's safe as can be, carefully guarded; equipped with pneumatic dust discharge and micrometer fence. Uniquely adaptable to sawing plywood — the perfect mitre saw bench for shop training. Let us help you select the Mitre Saw Bench or Band Saw best suited to your requirements.

(stationary table) may be had with five alternative tables, to give you a machine which is virtually custom built to provide the last degree of efficiency on your particular type of work. Below: Model XJS — with sliding left section table.

The TANNEWITZ WORKS
GRAND RAPIDS, MICHIGAN
SAWING MACHINERY SPECIALISTS

XJSW — with extended table at right

XJSW — with J-430 extended sliding table at left

XJW — with J-420 removable roll-table at left

"...it's the best classroom interest builder we've had in years!"

—says IRA MADDEN, Woodshop Teacher at Isaac Crary School, Detroit

● "For four years now, students in my classes have been participating in I.A.A. The enthusiasm they have shown for their classwork in connection with I.A.A. is without equal in all my years of teaching. We're already underway with our 1953 I.A.A. entries!"

Ford Motor Company's **INDUSTRIAL ARTS AWARDS** bring Nationwide acclaim to teachers, too!

I.A.A. is the largest competition of its kind giving recognition to teachers whose students build prize-winning projects. Teachers, of course, help make I.A.A. possible—and, for their participation, Ford Motor Company is delighted to honor them.

There is a place for *any* project, provided it is made in school under supervision of an industrial arts or vocational education teacher. Prizes are awarded in the different age groups of each division, so that students compete with others their own age.

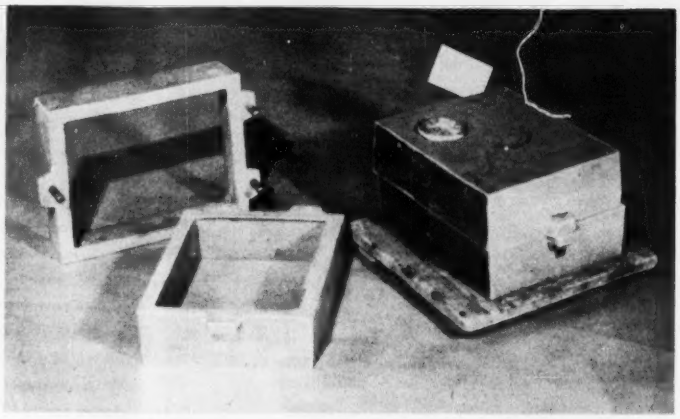
WIN A FREE TRIP TO DYNAMIC DETROIT

Teachers whose students win Outstanding Achievement Awards will be invited, expense-free, as 3-day guests of Ford Motor Company in Detroit. They will visit Ford's assembly line at River Rouge, the Henry Ford Museum, Greenfield Village, and other points of interest.

Tell your students about the 1953 I.A.A.!

Full information and entry blanks will be sent to you, on your request to:

INDUSTRIAL ARTS AWARDS
FORD MOTOR COMPANY
2931 Schaefer Road, Dearborn, Michigan



Cast Aluminum Flasks

By William B. Doose
North Hollywood Junior High School,
North Hollywood, California

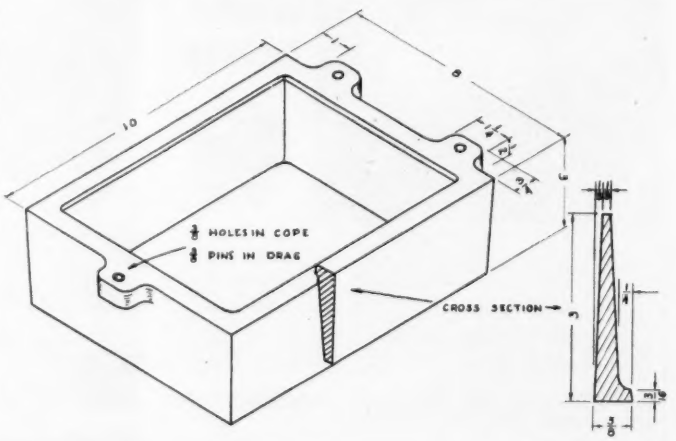
ONE of the problems encountered in the school foundry occurs when the molding is done in wooden flasks. As a result of the dampness of the sand and the heat of the molten metal, the wooden joints loosen up and destroy the usefulness of the flask. Then, too, the constant rapping on the wooden sides tends to make them splinter so they are hard to handle.

This difficulty can be overcome if the flasks are cast in aluminum. This provides a neater and much more efficient flask which, at the same time, eliminates the weakness and lessens the danger to the operator.

The accompanying sketch is presented as a suggestion for one type of flask which can be made in the school shop. In making the pattern, the sides and ends are made in one long strip. It can be shaped on the circular saw. The four pieces can be cut from the strip to the desired lengths in a miter box and nailed together at the corners. Provision is made for the locating pins by adding the three lugs as indicated on the sketch.

It has been found from experience that three sizes are sufficient for most projects cast in the school shop. These are 6″ x 8″, 8″ x 10″, and 10″ x 12″. If a pattern is made for each of these and a suitable number cast, the patterns may then be placed in storage to be used when needed.

Cast aluminum will solve your flask problem. No more loose joints and splinters will bother your students. ★



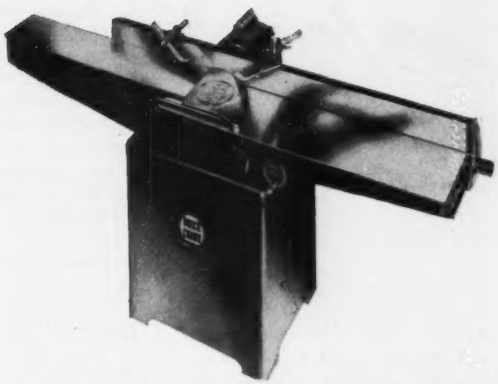
HOW LONG *should* JOINTER TABLES *and* FENCES BE?

In jointer design there is a definite relationship between fence length and table length. It is generally conceded that a jointer is as good as it is long. Lengthening of a table alone is not sufficient to increase the scope of use of a jointer. The fence, likewise, must be extended and should always be as long as the infeed table plus 60% of the length of the outfeed table and ABSOLUTELY RIGID ALONG ITS ENTIRE LENGTH. To assure accuracy and avoid work spoilage, tables and fences furthermore must be absolutely flat and straight, AND STAY THAT WAY.

BOICE-CRANE JOINTERS

have the longest fences of any 6" or 8" jointers, the longest tables of any 8" jointers, and afford the biggest values in any 6" and 8" jointers. They are rugged and accurate.

All Boice-Crane jointer head bearings stand speeds up to 5500 r.p.m. Tables are simultaneously ground flat and parallel to closest limits—stay flat. Boice-Crane offers the only long-table jointers with full-length front-adjusting, double-locked fences. After the fence has been double-locked, depth adjustment is made without disturbing the locked fence. When rabbeting, the exclusive guard on all Boice-Crane jointers stays on the machine—simply turn and swing out of the way.



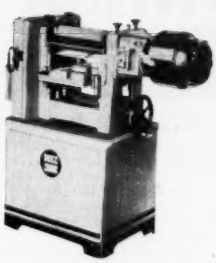
NEW, WELDED, ALL-STEEL-LONG-TABLE MODELS

permit strength, permanent accuracy and alignment impossible with bolted-up cast iron construction. Using steel (3 times stronger than cast iron of same thickness), tables are extended without increasing width, thickness, weight or floor space. A comparable cast iron jointer would weigh more than twice as much. Tables undergirded full length. There are no springy overhanging tables to spoil heavy work. Steel is actually 2 to 3 times stiffer than iron. The entire infeed table is a rabbet arm. These are the first jointers with adequate support for narrow rabbeting on wide stock. Quick, positive, micrometer-accurate knife setting. All knives cut the exact same depth within .002" to .003"—setting a new standard for perfect work without chatter marks... better finish... smoother operation. 3¼-inch diameter head (3⅛-inch cutting circle), 20% larger than conventional 6-inch jointers. Improved cutting angle. Depth of cut control, table locks, direct reading depth scale and switch easily used in a comfortable, normal operating position. New rotor-on-cutterhead or V-belt drive is optional.

Boice-Crane offers a complete line of job-rated jointers

Model No.		*Size*	*Without auxiliary feeding aids, recommended for stock lengths to*	*Length being a factor, recommended for stock sizes to*	*Planes boards and panels to*	*Fence*	*Depth of cut*	*Cutterhead diameter*	*Cutting arc diameter*
3400	Steel	8" x 84"	8 ft.	8" x 8"	16" wide	66" x 4"	5/8"	3¼"	3⅛"
2400	Steel	6" x 60"	6 ft.	6" x 6"	12" wide	48" x 4"	9/16"	3¼"	3⅛"
1400	Cast iron	6" x 36"	4 ft.	4" x 6"	12" wide	33" x 3⅜"	9/16"	2¾"	3"

A HEAVY-DUTY PLANER OF PRACTICAL CAPACITY AT A SENSIBLE PRICE!



THE BOICE-CRANE 12" x 4" THICKNESS PLANER

Includes every feature, but costs a hundred dollars less than planers only slightly wider. All the capacity average shops use, at a savings of 30% under the next larger size. Without butt-feeding, it planes pieces down to 6½" long and hard wood down to as thin as 1/16", smooth as silk and to a thousandth of an inch precision, without tearing. Saves big money by salvaging short and thin scrap.

OVER 50% FASTER THAN SIMILAR UNITS

Powered for output of 14 feet per minute. Massive, one-piece main frame and the extra weight bolted-up frames lack for long, accurate service.

STEADY, POWERFUL, GROOVED STEEL INFEED ROLL! FINER FEED MECHANISM ELIMINATES COSTLY MAINTENANCE!

No troublesome clutches or double-worm reduction gear overly vulnerable to intermittent strains and shocks in feeding stock. Simplified, quieter feed gear fully cushioned against jam-ups in feeding that cause others to fail. Instant feed control without stopping motor.

SIMPLE, EASY BLADE SETTING

12¼" x 20" table. Thick walls and exceptionally well ribbed table casting stays flat and true. Two table idler rolls—often omitted in inferior machines.

SAFER, SMOOTHER OPERATION

Less power required. Choice of 1½ and 2 h.p. direct to cutterhead or V-belt motor, engine or lineshaft drive. Bench or complete floor type units.

AVAILABLE NOW

through industrial supply distributors in most cities. No long waits for delivery. High quality, low cost tools for cutting, shaping, drilling finishing wood, fibre, metals and plastics.

BOICE-CRANE COMPANY
Toledo 6, Ohio
938 Central Avenue

Please send free literature on ( ) Boice-Crane Jointers ( ) Boice-Crane Thickness Planer.

Name .....
School .....
Street .....
City and State .....

Strictly Personal

ABOUT YOUR FELLOW TEACHERS

LAWRENCE BOROSAGE of the department of vocational education and practical arts of the University of Michigan has been appointed chief, trade and industrial service, U. S. Office of Education, Washington, D. C.

JAMES L. PATTON is the new chief of the state bureau of vocational education of Kentucky. He was formerly director of the Mayo State Vocational School at Paintsville, Ky., for about seven years.

CHARLES A. PROSSER, pioneer supporter of vocational education, and formerly director of Dunwoody Institute, died in Minneapolis on November 26. He was 81. Dr. Prosser was a director of the Federal Board of Vocational Education when the Smith-Hughes Act was passed, and was author of the famous Prosser Resolution for the 60 percent group.

LOUIS A. MCELROY is now director of the Phoenix Technical School at Phoenix, Arizona. He formerly served as assistant principal of the Emily Griffith Opportunity School in Denver, Colo. Mr. McElroy is a past president of the Colorado Vocational Association.

H. ROBERT KINKER is now chairman of the department of vocational education and guidance at Indiana University, Bloomington.

R. O. SMALL, retired state director of vocational education for Massachusetts, died recently.

CLIFTON G. BIGWOOD, vice-president in charge of operations and director of the L. S. Starrett Company of Athol, Mass., died on December 8 after 36 years with the company.

New officers of the National Association of State Directors of Vocational Education are: president, J. MARION ADAMS, Arkansas; vice-president, J. WARREN SMITH, North Carolina; and secretary-treasurer, CLARENCE L. GREIBER, Wisconsin.

RALPH E. BETTERLEY, who has been serving as assistant professor of industrial education at Stout Institute for the past six years, has accepted a similar position in industrial engineering at the Technological Institute of Northwestern University in Evanston.

JACK DONNELL has been named supervisor of industrial arts and director of adult education at Pasadena, Texas.

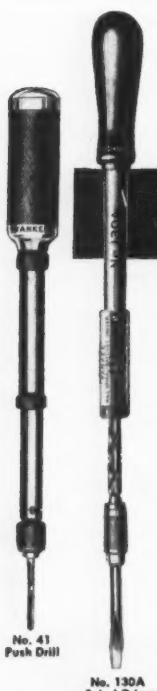
WILLIAM D. MACQUARRIE, associate professor and acting head of the industrial arts department at Long Beach State College, died November 24. ★

VIC . . . . . *from page 25*

The club has participated in a number of activities and shop projects, receiving wide recognition in San Antonio and South Texas through the press, radio, and television.

Typical of some of the activities of the chapter are the following in which the club has participated during the last school year: host to district and city-wide meetings of VIC, participation in district and state conventions, field trip to printing plant, printing directory of members now in service, printing stationery for all clubs in state, sponsored March of Dimes campaign in school, assisted in organizing new club for girls, printed and sold student directories, appeared on television show about VIC program, and held several social events.

All of this has added up to a worthwhile program for school and students. ★



Teach the *Time-Saving Way* with . . .

"YANKEE" TOOLS

Driving and Drawing of Screws are one-hand jobs with the quick-return "Yankee" Spiral Driver. A push on the handle spins the blade, turns the screw. Quick-return spring holds bit in slot and returns handle after each stroke. These popular screw drivers also available in standard style, without the quick-return feature.

Make Pilot Holes for Screws, Brads, Nails with the "Yankee" Automatic Push Drill. Reverse spin action clears chips. Improved chuck . . . drill points can't pull out. Magazine handle holds 8 drill points — 1/16th to 11/64ths.

Send for FREE "Yankee" Tool Book and handy reference chart showing relation of screw driver blades to screw sizes, and information on accessories that add to the utility of "Yankee" Spiral Screw Drivers. North Bros. Mfg. Co., 206 West Lehigh Ave., Phila. 33, Pa.

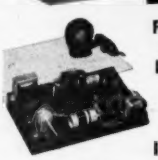
"YANKEE" TOOLS NOW PART OF STANLEY

THE TOOL BOX OF THE WORLD

NORTH BROS. MFG. CO., Philadelphia 33, Pa.

Everything in Electronics FOR THE SCHOOL!

FREE! 236-PAGE 1953 **ALLIED RADIO-TV CATALOG**



FAMOUS RADIO LAB KIT • 10 KITS IN ONE!

Amazingly instructive: builds receiver, amplifier, oscillator, signal tracer, timer, photo cell relay, etc. With all parts, tubes, mike, instructions. **83-265.** Only.....**$14.25**

"Ranger" AC-DC Radio Kit. A popular school project kit. Complete with cabinet. **83-275.** Only **$17.85**

Dozens of other kits available.

Automatic Control TAPE RECORDER

Most exceptional recorder value on the market. Fully described in ALLIED's Catalog. **96-485.** Only.....**$99.50**

SEND FOR IT!

ALLIED is the one *complete, dependable* school supply source for *all* radio and electronic needs. Our 236-page 1953 Buying Guide features the world's largest selections of:

- Radio Training Kits
- Laboratory Instruments
- Custom TV Chassis
- FM, AM Tuners & Radios
- Electronic Tubes & Parts
- Recorders & Accessories
- Sound Equipment
- Tools and Books

Depend on ALLIED for time-saving, money-saving, expert electronic supply service. Write today for our FREE 1953 Catalog — your guide to *everything* in Electronic equipment.

ALLIED RADIO

833 W. Jackson Blvd., Dept. 9-B-3
Chicago 7, Illinois

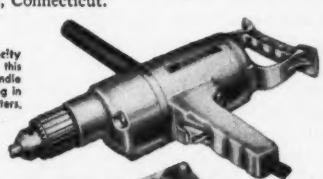
Specialists in Electronic Supply for Schools

the MIGHTY MIDGET

packs more power per pound

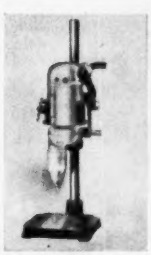
For advanced student or beginner the Mighty Midget is ideal. Its light weight (only 3½ lb.), balanced design and extra power make it easy to handle and accurate in operation. Its pistol grip, highly polished finish, geared chuck, removable chuck guard (extra) give it the quality features that appeal to instructors and students alike. Finished in 6 speeds from 600 to 5000 R.P.M. Phone your dealer for a demonstration. He'll be glad to show you the Mighty Midget in action.

Stanley Electric Tools, Educational Dept., 428 Myrtle Street, New Britain, Connecticut.



No. 112, ½" capacity Among other features this drill has the spindle offset to permit drilling in close quarters.

No. 160, 5/16" capacity A "D" handle drill of extra capacity and value. Sealed ball bearings, geared chuck, polished finish.



No. 531A Stand Stands are available to hold all Stanley Drills for bench operation.

STANLEY

Reg. U.S. Pat. Off.

HARDWARE • TOOLS • ELECTRIC TOOLS • STEEL STRAPPING • STEEL

Better shopwork with fine tools by GREENLEE

CHISELS, GOUGES, TURNING TOOLS

Tough, lasting fine cutting edges for all types of woodworking. Various types of socket butt and firmer chisels with "Hardwear" green plastic or hickory handles. Outside or inside bevel socket gouges. Short and full length turning tools.

AUGER BITS, CAR BITS AND DRILLS

There's a GREENLEE for every need . . . all types of twists and heads. Accurately sized, perfect cutting edges. Line includes the famous "Greenlee 22" Solid-Center Auger Bits which come to you "Plastic Sealed" for factory-sharp edges.

EXPANSIVE BITS

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GREENLEE Spiral Screw Drivers are sturdily constructed and have special phosphor bronze drive nuts for long, hard service. Beautifully finished, three sizes. Automatic Push Drills have completely enclosed working parts and phosphor bronze drive nuts. Handle holds eight points. Chromium plated.

The GREENLEE line also includes Bit Extensions, Razor-Blade Draw Knives, Ship Augers, Electricians' Bits, Hand Benders for Tubing, Radio Chassis Punches, Knockout Tools and many other timesaving tools for the shop worker and the student.

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News

HAPPENINGS IN INDUSTRIAL EDUCATION

New IA Scholarship

MICHIGAN high-school seniors wishing to pursue studies in industrial arts at Western Michigan College, Kalamazoo, will now be able to compete for a new scholarship made possible by the Atlas Press Company of Kalamazoo.

The tool-making firm will honor two students each year, presenting them with a scholarship having a total value of $500, $200 of which will be given to them the first year and $100 each of the three remaining years.

The first two winners will be announced next spring. From all applicants a list of 12 will be chosen, and the two winners will be named from this group. The two schools having the winning students also will receive an Atlas woodworking tool for the school shop.

Contest Winner

ANTON M. SEVCIK, industrial-arts instructor of El Campo, Texas, was awarded the $1000 Grand Award in the Delta School Shop Planning Contest at the AVA convention in Boston in December. Sevcik won his prize, a selection of $1000 worth of Delta power tools, for submitting the soundest plan for a high-school general shop.

The Delta contest, the first of its kind ever held, was developed in an effort to gather and present the most advanced thinking in school-shop layout.

Delta officials have announced that the prize-winning plans and such others as are considered to have unusual merit will be published in a brochure to be entitled "School Shops for Today and Tomorrow." This brochure will be distributed as a textbook to schools throughout the country. Copies may be reserved by writing to the Delta Power Tool Division, Rockwell Manufacturing Company, 400 N. Lexington Ave., Pittsburgh 8, Penn.

State Association of IE Clubs

A STATEWIDE organization of high-school industrial-education clubs has been formed in Illinois, with clubs from 14 high-schools in the state as charter members. The objects of the new organization include: to coordinate the aims of the individual clubs so they may work toward a common end, to foster high ideals and appreciation in the dignity of work, to foster a wholesome understanding of the functions of both labor and capital and a recognition of their mutual interdependence, and to create a deep interest and esteem for industrial education.

John Warhoover, a junior in O'Fallon Township High School, has been named president of the new association.

Speakers on Machine Tools

THE National Machine Tool Builders' Association has inaugurated a Speakers' Bureau composed of executives of machine-tool-building companies to give talks on machine tools and their function in our productive system.

Anyone interested in obtaining a speaker from the Bureau is asked to write R. H. McGrath, National Machine Tool Builders' Association, 10525 Carnegie Ave., Cleveland 6, Ohio.

IA Grows in Missouri

A TOTAL of 267 schools in Missouri are now offering industrial-arts programs. This is more than double the number five years ago when only 125 had such programs.

Twenty-four new IA programs were opened last fall. The new schools offering the programs were: Bogard, California, Collins, Fordland, Grant City, Greenfield, Hardin, Higginsville, Lewistown, Lindbergh School in St. Louis County, Linneus, Lowry City, Meadville, Newtown, Patton, Paynesville, Pickett, Pierce City, Rogersville, Seymour, Stewartsville, Urich, Watkins School, and Zalma.

Convention Calendar

New Jersey Vocational and Arts Association, Asbury Park, March 19-21.
California Industrial Education Association, Santa Barbara, March 20-21.
Ohio Industrial Arts Association, Neil House, Columbus, March 26-28.
Illinois Vocational Association, Peoria, March 26-28.
Texas Vocational Association, Texas Hotel, Fort Worth, April 2-4.
Michigan Industrial Education Society, Civic Auditorium, Grand Rapids, April 16-18.
New York State Vocational and Practical Arts Association, Hotel Statler, New York City, April 23-25.
Indiana Industrial Education Association, Civic Center, Hammond, April 23-25.
American Council of Industrial Arts Supervisors, Statler Hotel, Detroit, April 28-29.
American Council of Industrial Arts Teacher Education, Statler Hotel, Detroit, April 29.
American Industrial Arts Association, Statler Hotel, Detroit, April 29-May 2.
Georgia Vocational Association, Municipal Auditorium, Macon, June 11-12.
Pennsylvania Vocational Association, Eagles Mere, June 17-19.

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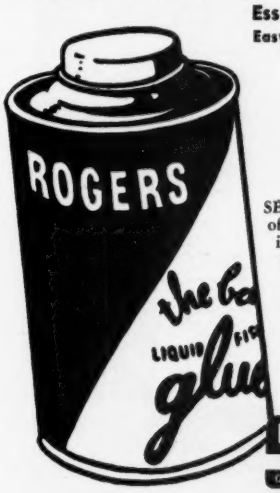

SEND FOR YOUR FREE COPY of Roger's Book of Woodworking Shop notes and new Project Plans for your school shop. Includes data on equipment selection and woodworking procedure . . . diagrams on making different types of joints . . . and step-by-step building instructions. Write today for these valuable educational aids.

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No longer does any shop need be without the advantages of band sawing for metal cut-off work. The new Wells Model 49A fits the smallest shop's budget, yet it does a man-sized job in any plant. From its welded steel frame to its tubular steel base, the Wells Model 49A is a rugged shop tool that will give long, dependable service. Its portability is unequalled. Easy to operate without special training, the Model 49A can be used by anyone in the shop. Automatic shut-off at the end of the cut eliminates the need for the operator to stand by. The continuous cutting action, utilizing every tooth of the band saw blade, means more economical cutting too. Write for complete details, today.

DESIGN DETAILS

Capacity: Rectangular, 3½"x6¾"; Rounds, 3½" diameter.

Blade: Size — ½"x.025" x5' motor: 1/6 HP, Ball Bearing—foot mounting.

Speeds: Selective (belt change) 54, 100, 190 f.p.m. Drive: "V" Belt.

Vise: Quick action.

Blade Guides: Stationary brackets with adjustable blade guides.

Wheels: Disc type idler and drive wheels, mounted on grease-sealed ball bearings.

Blade Tension: Incorporated in frame design.

Switch: Manual — automatic stop.

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Bed Area: 6½" x 24".

Floor Space: 16½" x 38".

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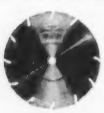
No. 4 Compass Saw—reversible blade, rugged hardwood handle.

No. 10 Coping Saw—4¾" throat. Blade can be turned to any angle.



D-3200 Deluxe Circular Saw—hollow ground combination saw, in diameters from 6" to 10".

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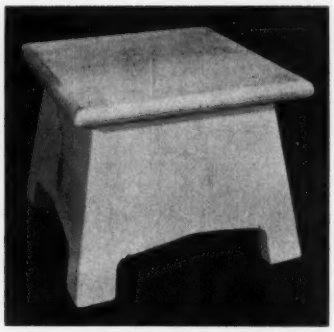
Much can be learned by making this

Tot's Stool

By James Wise, Instructor, and Franklin Schneider and Dick O'Brien, Students, Minonk, Illinois, High School



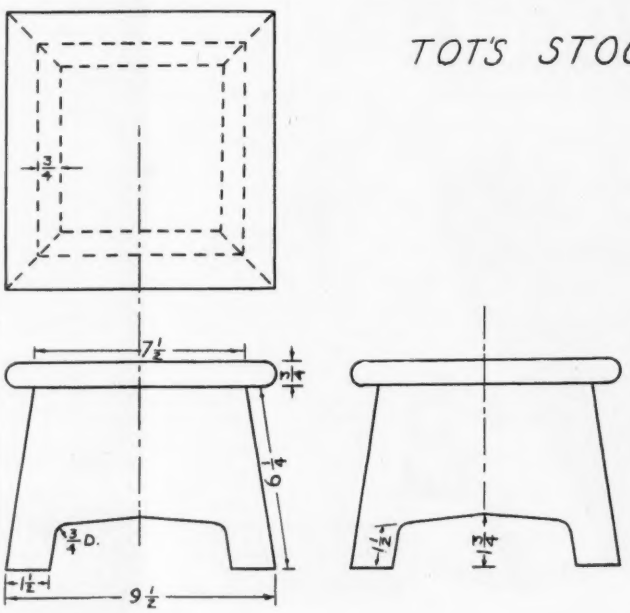
Joints are mitered in this wood-shop project.

HERE is a project that will be welcomed in the homes of boys who have younger brothers and sisters. Not only does it give the beginner experiences in making miter joints, cutting curves tangent to straight lines, gauging and shaping a round edge, but it will be used for years in the home for tots to reach light switches at conventional heights and other things built for adults.

The project can be made from one piece of lumber 1" x 10" x 3'.

Procedure:

1. Draw pattern of a side to the dimensions given in the drawing, using a piece of cardboard or stiff paper.
2. Cut out the outside boundary lines of the pattern being sure to leave the lower portion containing the centers of the holes to be bored later.
3. Cut out four pieces of material for the sides, 6¼" x 9½".
4. Trace the pattern on each of these pieces, being sure to mark the centers of the arcs in the lower part of the pattern. The grain of the wood should run vertically.
5. Drill two ¾" holes in each side, using the centers that were located by the pattern. These holes will form the arcs of the outline of the pattern.
6. Cut out the remaining part of the pattern and trace these lines on the side.
7. Saw mitre corners, being sure to produce a tight fitting joint.
8. Cut outline of lower part of pattern forming the feet.
9. Fit mitre corners with block plane if necessary and fasten with glue and 4D finishing nails.
10. Cut out material for top, ¾" x 9½" x 9½".
11. Scribe lines ⅜" back from each edge and plane the thumb mold as shown in the photograph.
12. Fasten the top in place with 4D finishing nails.
13. Sand all parts until they are clean and smooth and ready for finishing.
14. Finish as desired. ★



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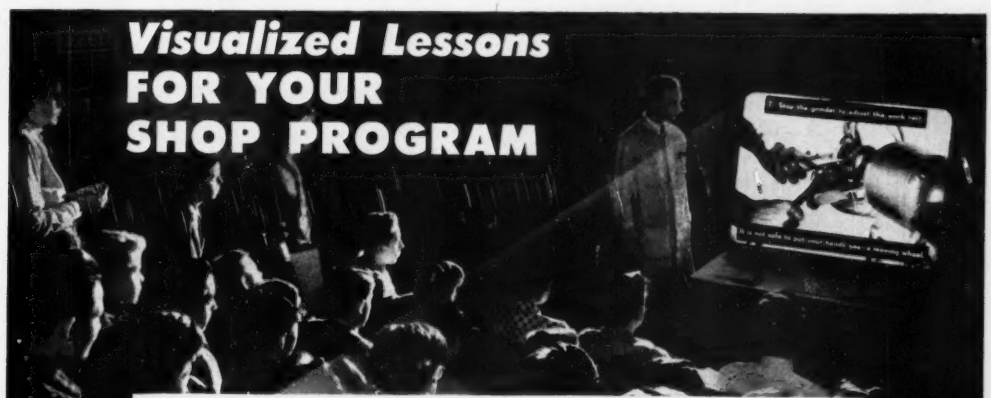

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Diamond Dust . . .

from page 28

conscience nor standards of measurement.

Then too, we find just as great variation in the interpretation of accuracy when we consider the different types of work being carried on in our school shops. In drafting and toolmaking, tolerances in dimensions frequently go as low as .001. In patternmaking the tolerances are likely to be more liberal, while in most cases in carpentry one-eighth more or less will annoy no one.

In all of these areas of human activity these standards are recognized by craftsmen, and the results of a worker's effort are measured by them. Because of this, it is customary for a qualified mechanic to evaluate a job on the extent to which they have been observed.

The thoughtful shop teacher is conscious of these conditions and is extremely careful that all of the work turned out in his shop meets the standards prevailing in commercial practice.

What happens if he is careless and permits a job to be taken out of the school which violates these standards? The pupil takes his work home to his family with considerable pride. His father, who is a craftsman, looks with distress on the many deviations from the standards which he knows prevail in his trade. Because of his observations he begins to question in his mind the kind of education being provided in the school shop. Not only so but he views with suspicion the qualifications of any teacher who would put the stamp of his approval on any piece of work that could not meet the customary tests applied to similar work in industry.

From this it is an easy step to the point where the assumption is made that if the instruction being given in the school shop is bad there is a probability that the teaching of mathematics, English, science, and physics is just as bad. The citizens of the community may finally feel so strongly about the whole situation that they will rise in open rebellion when the school authorities present a request for more millage in order to pay the teachers higher salaries.

In view of all this, it is imperative that industrial-arts teachers concern themselves with the task of establishing standards of accuracy for the type of work for which they are responsible. These standards should conform to those commonly accepted by people who are employed in types of work similar to that done in industrial arts. *Teachers must be meticulous in observing them.*

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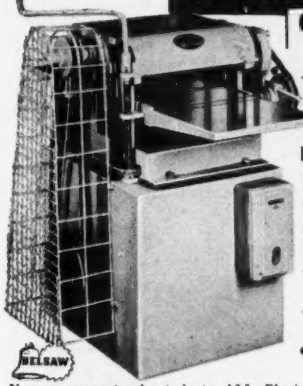

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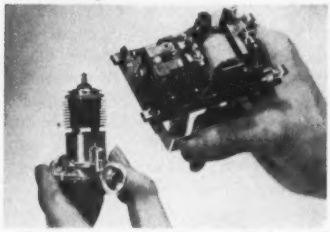
News from INDUSTRY

Herkimer Markets New OK Model Engines



The increase in radio controlled model plane flying since the FCC established a "citizens' band" has resulted in the design and production of a new class A engine by Herkimer Tool and Model Works. The OK Cub .14, which weighs only 2¾ ounces, is said to have a better power-to-weight ratio than other engines in its class and results in the delivery of good performance while carrying heavier radio equipment even in rough air.

A second miniature engine is being distributed nationally. It is a new ½ A class engine, the .049X, smaller and lighter than any other OK engine in its class. Among its features are a sturdier, crash-proof, and block-tested crankcase, and guaranteed starting ability.

For information about either of these OK model plane engines, write Herkimer Tool and Model Works, Inc., Herkimer, N.Y., mentioning SCHOOL SHOP; or *check no. 41 on the coupon.*

Well-Known Chicago Firm Outgrows Its Name

Effective October 1, Skilsaw, Inc., of 5033 Elston Ave., Chicago, became officially SKIL Corporation because the company's line so far exceeds what the old name suggested, according to Bolton Sullivan, president.

The SKIL Corporation is now producing all types of portable tools including saws, drills, sanders, grinders, drivers, and polishers. For information about any of these write the company mentioning SCHOOL SHOP; or *check no. 42 on the coupon.*

Each item listed above is numbered. Check the numbers of the items you want, and mail the coupon, properly filled in, to . . .

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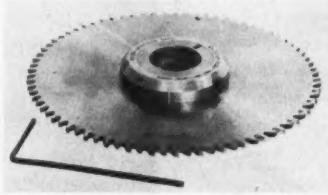
3-53

Magna Engineering Introduces Newly-Designed Dado



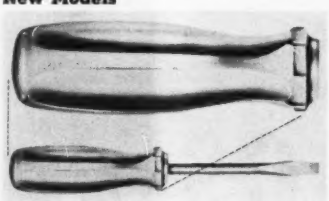
A dado assembly of new design which features a geared hub and has no loose parts is now produced by Magna Engineering Corporation.

Called Magna Dado, the new tool has an 8" blade designed for oscillating dado cutting. It is ⅛" thick and has a unique tooth profile. The diameter of the blade permits cuts up to 2" and it fits saws with ⅝" or ¾" arbors.

An Allen wrench activates the hub gears. Calibrations provide setting guides, but numerous widths between 5/32" and ⅞" are possible by using settings between calibrations. Width changes are accomplished by loosening the arbor nut which frees the hub gears for quick readjustment. Magna Dado can be resharpened by any professional saw filer.

Additional information will be sent on request to Magna Engineering Corp., Menlo Park, Calif. Please mention SCHOOL SHOP when writing; or *check no. 43 on the coupon.*

Proto Presents New Handles, New Models



Adoption of a new screwdriver handle design and the addition of 13 new sizes is the latest news from the Plomb Tool Company. A hand-shaped, nonrolling design for the plastic handles of all Proto screwdrivers provides a tighter, more powerful grip. Handles are molded integrally with alloy-steel blades. The plastic is tough, a good insulator, non-explosive and listed by UL.

The 13 new screwdrivers provide a more complete selection of bit widths and blade lengths. Five are regular-type screwdrivers with standard bit and square shank. Eight are cabinet-type models, with straight bit and round shank.

To obtain more information on Proto tools write the Plomb Tool Company, Los Angeles 54, Calif., mentioning SCHOOL SHOP; or *check no. 44 on the coupon.*

New Literature

Operation Craftsmanship is published by the Gramercy Import Company to describe the Riefler line of custom finished imported drawing instruments and accessories they handle. The booklet gives the history behind the drawing instruments and illustrates available models. For a free copy of the catalog, write Gramercy Import Company, Inc., 16 Beaver St., New York 4, N.Y., mentioning SCHOOL SHOP; or *check no. 45 on the coupon.*

Parent Metal Products Catalog No. 752. has just been published, describing and illustrating their industrial-arts and vocational-shop equipment of steel, including wood- and metal-work benches, locker-bench combinations, drawing tables, chairs, and desk combinations. Copies of the catalog may be obtained by writing Parent Metal Products, Philadelphia 6, Pa., mentioning SCHOOL SHOP; or *check no. 46 on the coupon.*

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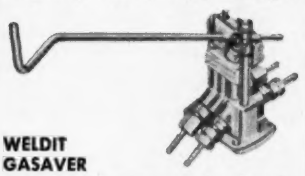

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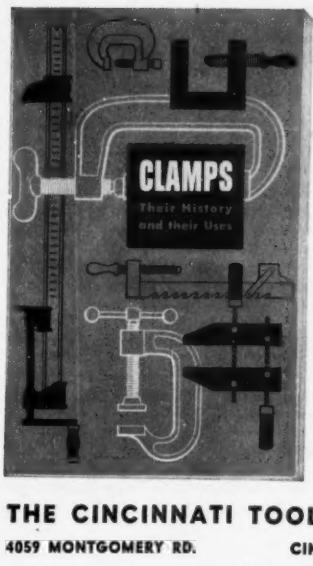

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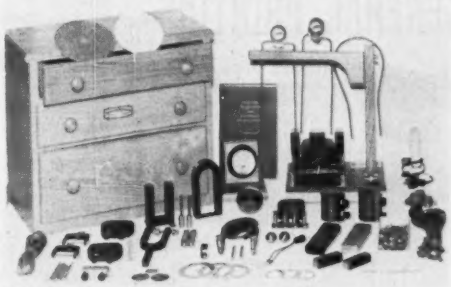

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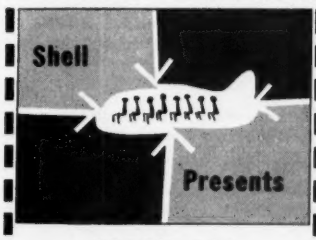

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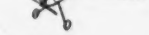

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Books:

Materials and Processes. Kohn and Starfield. New York: The Macmillan Co., 1952. Pp. x + 483. $3.28.

The purpose of this book is to impress pupils with the fact that they live in a technical world, and that everything they handle, wear, or use is the result of technical development. In order to achieve this, the authors have presented a broad view of the technical industries by tracing the basic raw materials from their sources, through their processing, to their ultimate use.

The various sections cover wood, fuels, ceramics, metals, and plastics, each subject being covered quite exhaustively. Technical language has been avoided wherever possible which makes it suitable for use in different types of classes in our public schools. It should be a mine of information for teachers who are concerned with teaching related subjects. These teachers will be particularly appreciative of the lists of questions that appear at the end of each chapter.

Max Kohn and Martin J. Starfield are members of the staff of the Brooklyn, N.Y., Technical High School.

Manual for Ford Owners. Packer. Chicago: Popular Mechanics Press, 1952. Pp. 304. $3.50.

This book was written primarily for people who own or drive Ford cars. However, it should serve as an excellent text for a class in automechanics when the problem of studying this make of car arises. The book is profusely illustrated and it is written in language which the nontechnical person can understand. A copy of it should be in the reference library of every school auto shop.

C. E. Packer is Special Service Editor of *Automobile Digest* and his long experience in this field marks him as an authority on his subject.

The Book of Hobby Craft. Wagner. New York: Dodd, Mead and Co., 1952. Pp. 95. $2.75.

This book contains 41 projects in the fields of woodwork, metalwork, electricity, ceramics, and plastics. Over 300 photographs and detailed drawings show how to make each article step by step.

Teachers of industrial arts will find in it a wealth of suggestions with which to supplement what they are doing at present. It will be particularly helpful to the teacher in a general shop who has the responsibility of teaching in a number of different areas.

Glenn A. Wagner is a former industrial-arts teacher.

Decorative Woodwork. (Third Edition.) Grimwood and Goodyear, Peoria, Ill.: Chas. A. Bennett Co., Inc. 1952. Pp. xiii + 239. $8.50.

In this book the subject of design is discussed at some length. The relationship between function and design, proportion, and the use of the chamfer and the joint as decorative features are covered.

There is a chapter on tools and their maintenance, another on moldings, and still others on the use of laminated board and finishing.

This third edition includes additional illustrations as well as some recent examples of fine craftsmanship.

Both authors are Englishmen. Herbert H. Grimwood is Principal of the School of Woodcarving, South Kensington, London. Frederick Goodyear is Craft Master at Chatham House School, Ramsgate.

How to Recognize Type Faces. Karch. Bloomington, Ill.: McKnight & McKnight Publishing Co., 1952. Pp. 265. $6.00.

This book provides a convenient reference which will enable the pupil to recognize each of 1475 type faces sold in fonts in the United States. Since it is practically impossible for anyone to be familiar with all of them, this publication should be a welcome addition to the libraries of every school print shop in the country.

By using this book pupils can readily find a specimen of any type face in a few minutes. It will enable them to recognize type faces by comparison. They should be able to note similarities in type-face designs, and they should be aided in their efforts to answer the many questions that arise in regard to type faces.

R. Randolph Karch is Senior Adviser in Trade and Industrial Education in the Department of Public Instruction, Harrisburg, Pa.

Applied Mathematics for Technical Students. (2nd Edition.) Corrington. New York: Harper & Bros., 1952. Pp. 414. $4.00.

This book is designed specifically for technical students and has been widely used in technical institutes and high schools, as well as in junior colleges and universities.

The new edition has been expanded by two chapters, one on plane geometry and one on graphs. Then too, some of the original chapters have been revised to clarify the presentation.

Murlan S. Corrington is a radio engineer with the Radio Corporation of America, Camden, N.J.

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Studies of Student Personnel by Frances M. Wilson and Morris Krugman is one of the reports of the Cooperative Study of Vocational Education in the New York City Schools. Answers are given to such questions as: Why do students select a vocational or academic high school? Who helps them select a school? What happens to them in vocational high schools? Why do they drop out? The report is issued by the New York State Education Department, Albany.

Audio-Visuals:

Bench Planes is a new series of nine film strips covering correct use of planes and is issued by Stanley Tools for use in shop classes at all grade levels. This first series covers in accurate detail the essential information on adjustments, correct use, and care of bench planes. The material is presented in logical step-by-step sequence so that it can accompany a demonstration of plane use. A comprehensive booklet including suggested questions for testing students comes with each set. Available at cost of $5 from Educational Dept., Stanley Tools, New Britain, Conn.

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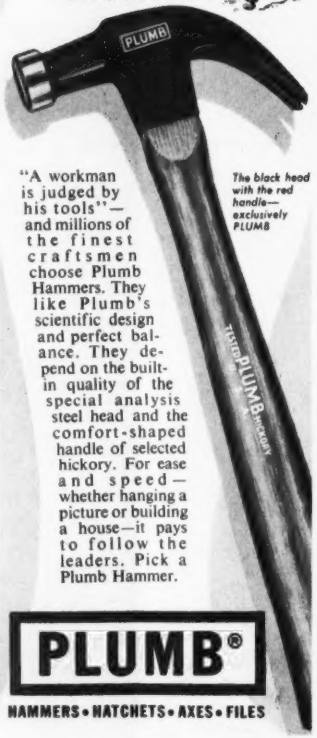

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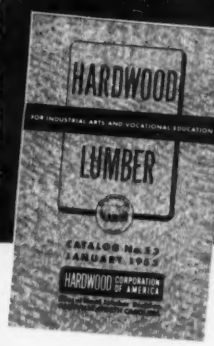

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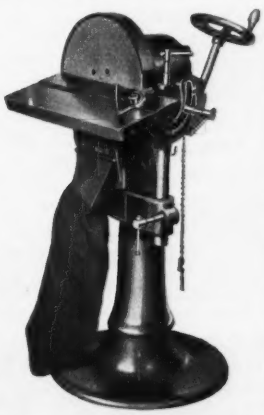

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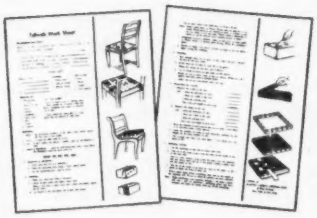

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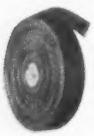

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Washington . . . . *from page 48*

Under automation, the supervisor's job will change. He will need more knowledge of the overall production process and more skill in dealing with his subordinates. Automation will not necessarily mean drastic cuts in supervisors. Ford uses one supervisor for every 18 workers at its automatic plant compared with one for 31 in a more traditional factory.

Training of skilled workers will remain a problem even after automation is well established. Companies will have to work more closely with universities and local trade schools to get the men they will need for these specialized jobs, industrialists say.

Limelight for the Local Director.—The local director of vocational education will take on new importance in the school picture if recommendations of the AVA are accepted by school administrators in each community across the nation.

The AVA believes that "many more communities" should not only appoint local vocational directors but should give them a place at the planning tables where policy is formulated. "It is not his title which is important but his place in the structure of local administration. The persons selected to direct vocational-education services should be given the rank and salary that are commensurate with the difficulties and importance of his functions." This statement as well as the other ideas that follow are from a forthcoming AVA document that should do much to raise the importance of vocational education in the minds of school executives.

The document will be called "Administration of Vocational Education at State and Local Levels." Through its pages, the AVA will express the belief that to give the local vocational educa-

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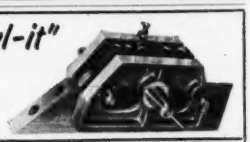

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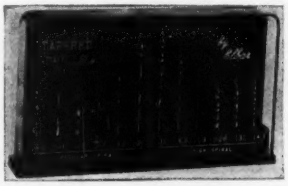

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tor-administrator a seat at the school system's planning table is not enough. He should also be given responsible tasks. First, he should have the right to recommend for employment all members of the professional staff in vocational education. "Selection by other persons or by a central body often brings in persons with desirable academic qualifications but no experience in vocations and little sympathy with vocational education," the document will say. "Recommendation by the local director for all professional positions is a safeguard for a vocational-education staff which will devote itself wholeheartedly and intelligently to the promotion of sound vocational education."

Then, too, the local administrator should be the kind of person who could go after and get "public favor and support" to meet the relatively large costs of vocational education. He should know how to develop good relations with labor, employers, and others outside the school organization. He should help set up courses; purchase equipment; prepare budgets; develop and revise instructional materials; work with advisory groups; and tell the people about vocational programs through exhibits, radio, television, and news stories.

All this may not be new to vocational educators, but it will be new and sound advice to those school executives who still have only a fleeting interest in education for work. ★

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Write Your Congressman.—It's still anybody's guess what the Eisenhower administration and the Republican-controlled Congress will do about vocational education. This much is certain: they will all but ignore the Truman recommendations in his (final) budget message and will insist on reexamining all facets of vocational education through their own eyes.

The intent of the new lawmakers will make itself evident after the hearings on appropriations, early in the spring. This means, that regardless of what the lame-duck Bureau of the Budget had planned, there is still time for state and local leaders to make *their* wishes known. Freshmen lawmakers admit that they need "a lot of education" on the bills and appropriations measures that come before them. This, then, may be a good time to help educate Congress on the purposes and needs of vocational education. Through that old-fashioned device, of course: letters to your Congressmen.

Introducing Durkin.—Meet the new U.S. Secretary of Labor, the man who may have a lot to say about the future of vocational education. Despite the fact that Martin P. Durkin is a Democrat in a Republican administration, he is expected to command respect in Congress and the Cabinet. He is 58, liberal, trade unionist, and of an Ickes-like reputation for honesty. He started as an apprentice steamfitter, but soon got interested in union affairs. When Eisenhower picked him for the Cabinet, Durkin was national secretary-treasurer of the powerful plumbers union.

Durkin believes in education for work and has an especially warm feeling for apprenticeship.

Rumor and Fact.—Rumor and fact plague the U. S. Office of Education. The rumors were that U. S. Commissioner of Education McGrath was to quit to give the new Federal Security Administrator, Oveta Culp Hobby, a free hand to choose the person she wants for the top education job; that Joe Strobel, in office as assistant commissioner for vocational education only a few months, is being asked to return to his Ohio State University job. The facts are that illness has disabled for the time being that great public servant Ward P. Beard, assistant director in the vocational-education division; and a heart attack killed James T. Gearon, the able head of the division's reports and analysis section.

Spelling It Out.—We learn that the AVA research and publications committee is preparing a booklet to define terms used by vocational and practical-arts educators. Its purpose is to make certain that the same word means the same thing to people working in far-flung areas of vocational education. Some of the terms will present no problems—"coordinator," "George-Dean Act," "local director." Others are a bit more elusive in their meaning even for dictionary makers—"diversified occupations," "related instruction," "industrial arts" (as distinguished from trade and industrial education). And, of course, the wordsmiths are also trying their hand at explaining "distributive education"—as baffling a phrase as anyone ever coined.

"Automation."—One term we hadn't noticed in the first draft of the booklet is "automation." Yet this word is cropping up in talk by both Labor and Commerce Department officials. Automation is the complete mechanical control of an industrial process or an entire factory. The term does not startle those who are close to industry. They say casually that the automative factory is coming closer every day. The Ford Motor Co. is turning to automation to take the drudgery out of factory work as well as to control "the cost you can't seem to stop—the labor cost." Ford executives estimate that its automatic factory in the Cleveland area can save 25 percent to 30 percent in direct labor. Similar savings are reported for an automatic Standard Oil refraction plant that requires only four men to operate it.

Neither Labor nor Commerce Department officials fear that automation will throw large numbers of people out of work. They believe that the automatic factory will bring an expanding economy and will create new job opportunities for the displaced.

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